Water Treatment

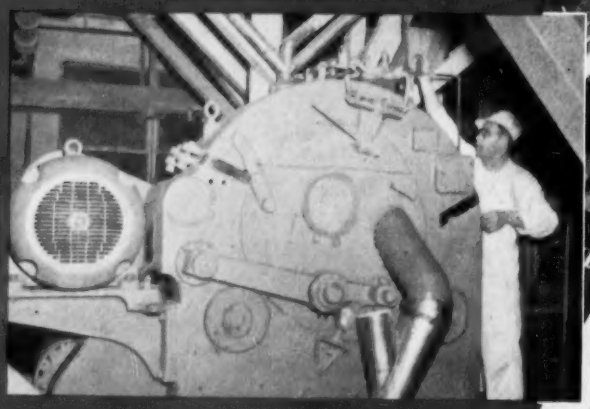
APRIL 1955

35 CENTS

FOOD ENGINEERING

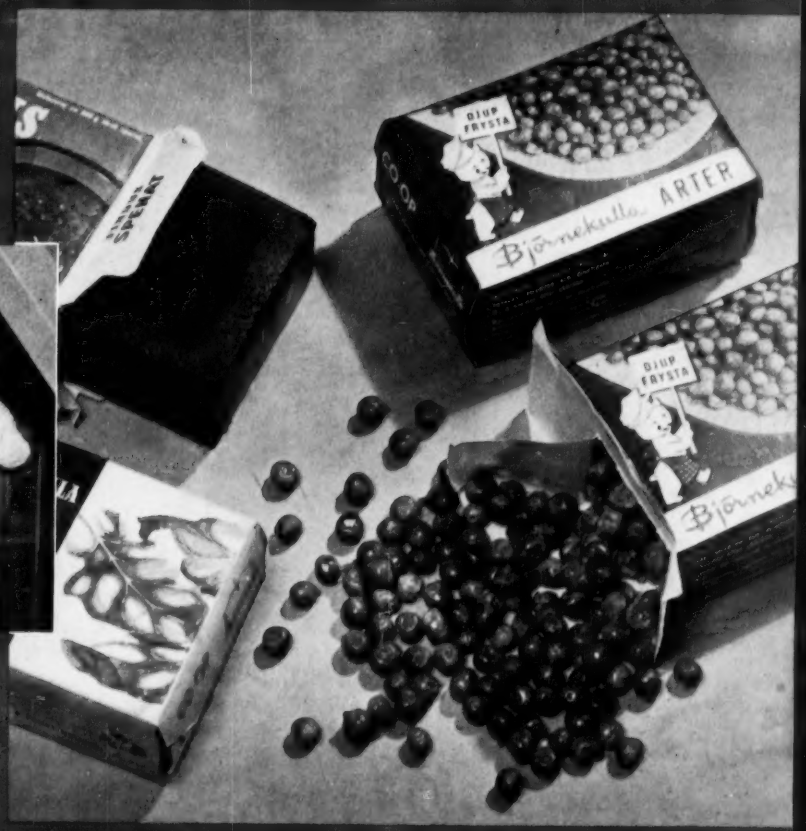
A McGRAW-HILL PUBLICATION

INSTRUMENTS • Falling stream of bagasse is "weighed" by Geiger counter. p. 80



PROCESSING • Revolutionary impact mill produces stable whole-wheat flour. p. 68

TRANSPORTATION • Shortening in bulk is pumped into bakery from truck. p. 81



PACKAGING • New light-seal, easy-to-open food carton has wide application range — frozen foods to powders. p. 63

ALSO: INGREDIENTS • SANITATION • MAINTENANCE MATERIALS HANDLING • PRODUCTS • QUALITY CONTROL ENGINEERING • PERSONNEL

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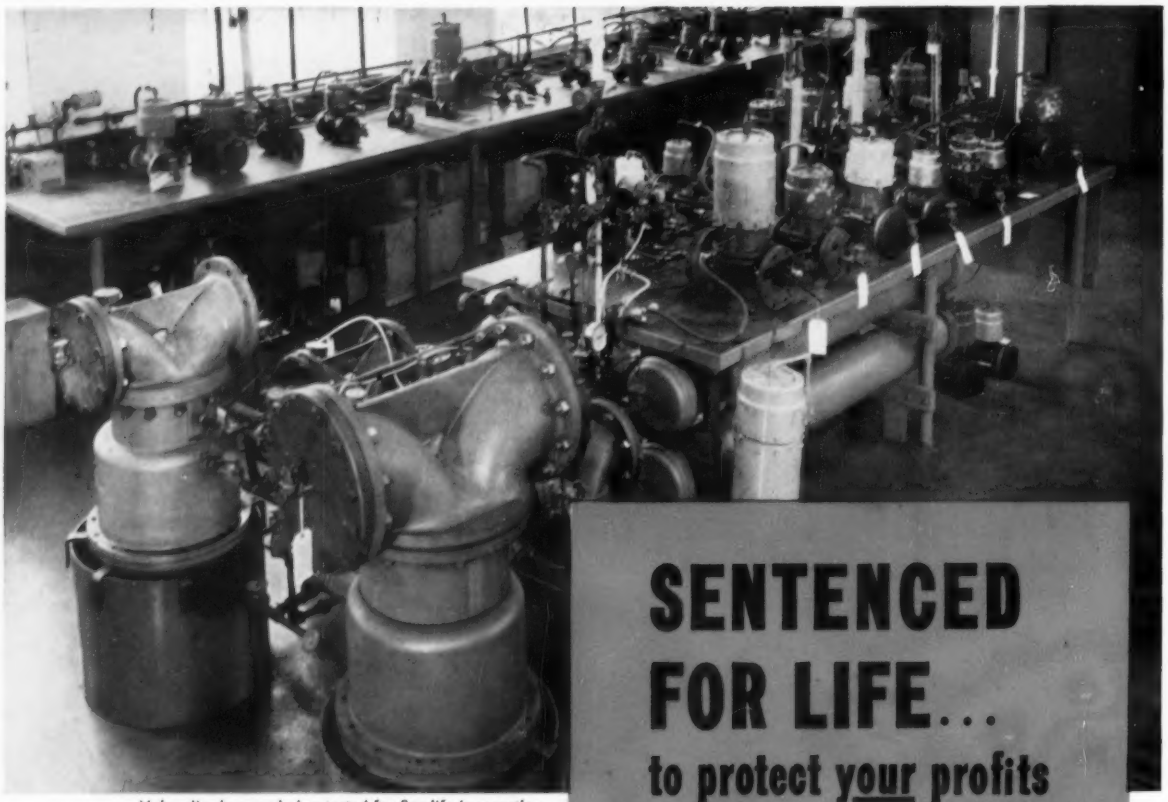

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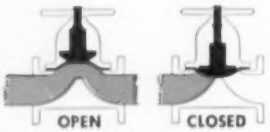
Valve diaphragms being tested for flex-life in a section of Grinnell's extensive Testing Laboratory.

Rubber mill for mixing experimental diaphragm compounds.



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- Diaphragm absolutely isolates working parts from the line fluid.
- Diaphragm lifts high for full, streamline flow in either direction.
- Diaphragm effects positive, leak-tight closure.
- Body, lining and diaphragm materials to suit service.
- Diaphragms easily replaced without removing valve body from line.

GRINNELL-SAUNDERS DIAPHRAGM VALVES have won an envied reputation for long, trouble-free service under the toughest operating conditions. One reason is Grinnell's continuous test program. In this life-test laboratory, valves and diaphragms operate day and night, through thousands of opening and closing cycles, to pre-prove performance. Result — better valves for all types of services.

This program of continuous testing is the basic reason why so many different industries are turning to Grinnell-Saunders for diaphragm valves with *pre-proved* performance. There are standard types for a wide variety of applications . . . in the handling of corrosive liquids, gases, beverages, compressed air, fluids loaded with suspended solids — on lines where leakage, corrosion, clogging, abrasion, or contamination could be costly.

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pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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April 1955

Volume 27 Number 4

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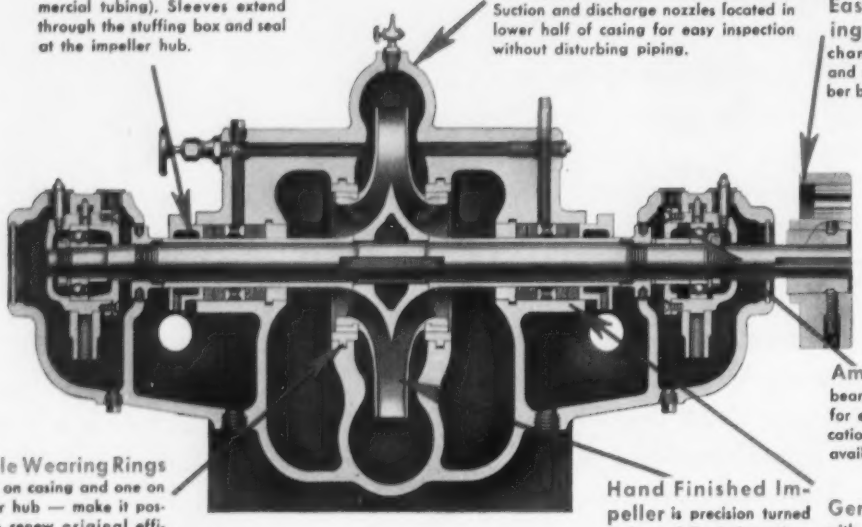
Get 8 Advantages of GOOD PUMP DESIGN

ALLIS-CHALMERS Double-Suction PUMPS



Longer Shaft Sleeve Wear with cast shaft sleeves (not commercial tubing). Sleeves extend through the stuffing box and seal at the impeller hub.

Greater Rigidity with heavy horizontally split cast-iron casing construction. Suction and discharge nozzles located in lower half of casing for easy inspection without disturbing piping.

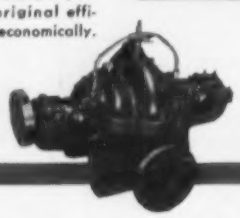
Easy Coupling Mounting with *Magic-Grip* quick change bushings for pump and drive shaft. Pin and rubber bushing type usually used.

Ample Bearings — Ball bearings may be furnished for either oil or grease lubrication. Split shell bearings also available in larger sizes.

Double Wearing Rings — one on casing and one on impeller hub — make it possible to renew original efficiency easily and economically.

Hand Finished Impeller is precision turned and carefully balanced to assure vibrationless operation and close wearing ring clearance.

Generous Stuffing Box with sufficient packing to keep stuffing box maintenance low. Provision made for sealing water connection or grease seal if required.



Wide Choice of Materials is available for all types of service — iron, bronze, stainless steel and combinations.

HEAVY DUTY CONSTRUCTION with no skimping, no corner cutting is what you'll find in Allis-Chalmers double-suction pumps. Extra metal thicknesses, extra strong parts, extra features and extra careful workmanship add up to long life, low maintenance, and low cost per gallon pumped.

Every Allis-Chalmers double-suction pump is carefully tested on the most modern testing equipment in the industry. Each installation is individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs. Stock sizes from 10 to 7000 gpm with heads to 475 feet.

Complete Pumping Unit

Allis-Chalmers can furnish the complete installation — pump, motor, control and drive — all built of coordinated design and manufacture.

Whatever your pumping problem, call your A-C Authorized Distributor or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146.

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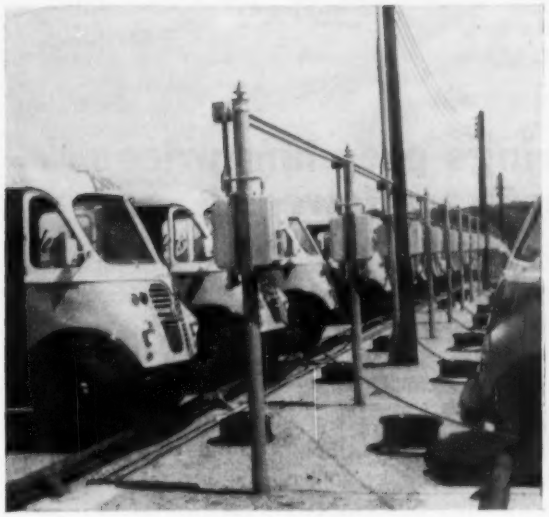
ALLIS-CHALMERS

For more information, use coupon on last page.

PRACTICAL IDEAS



Truck Refrigeration Made Safe

A 100% refrigerated delivery system by means of self-contained refrigeration units recently introduced at the Menands New York milk unit of the Borden Co., keeps the plant's fleet of 51 delivery trucks refrigerated at a constant 40 deg. temperature and eliminates the need for icing down of cases. Dripping of melted ice that formerly occurred is ended.

Now, at the end of a work day the driver immediately has his truck reloaded for the next day's run and then parks it at one of the circuit breaker stations (see left photo). These are mounted conveniently on a steel rack in the center of the parking lot.

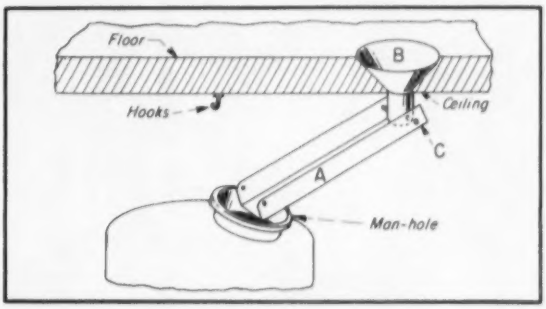
To plug in the driver removes a length of rubber-covered cable attached at one end to the van refrigeration unit, and at the other to a Crouse-Hinds APJ plug. By inserting the plug into the breaker interlocked receptacle, he causes 220 volts to feed to the truck refrigeration unit for the rest of the night. The next morning, after removing and replacing the plug, he may drive to his route in a truck that will be adequately chilled for the remainder of the day.

The circuit breakers are housed in heavy-duty Feraloy boxes which are dust-tight and weather resistant. Although only 30 amperes are necessary at this plant, the circuit breaker can provide over-current protection up to a top capacity of 100 amperes at 600 volts.

Since both circuit breakers and plug receptacles are designed for use with portable electrical equipment, they protect personnel using them in wet weather. The circuit breakers have an interlocking plug-receptacle, with a spring-door housing attachment at the bottom of the breaker box (see right photo).

The receptacle is so interlocked with the circuit breaker that the plug cannot be inserted or withdrawn unless the breaker is off. Furthermore, the breaker cannot be closed unless the plug is fully inserted.

Another safety feature is an extra contact in the receptacle and plug for connecting the grounding conductor of the portable cable.



Dual Purpose Chute

A homemade chute provides a quick and easy means for adding either solid or liquid ingredients to a syrup tank with only a man-hole for an opening.

Formerly, this time-consuming job required carrying 250-lb. sacks of raw sugar to an elevated stand adjacent to the tank and emptying the bags from there. The operator scooped the sugar through the man-hole until the bag was light enough to lift.

But with a hole cut in the floor above the tank room

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(Formerly Food Industries)

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Louisville Method

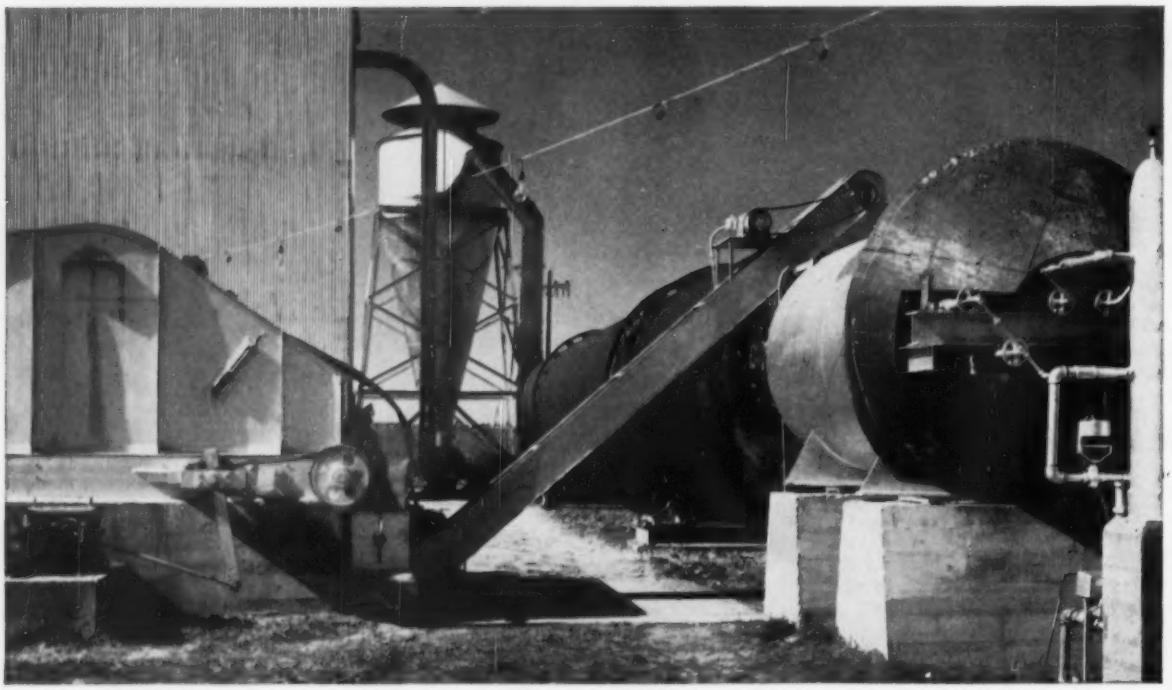
Type H Dryer User Reports . . .

"alfalfa brings premium prices . . . drying costs are *lower!*"

Louisville Type H Dryer keeps carotene content high. This top quality commands top prices anywhere. And the big production capacity of this dryer means lower drying costs, too.

The Type H Dryer, developed to retain maximum carotene value in chopped alfalfa, is also useful for handling other feedstuffs, including sweet potatoes, bagasse and sugar beet pulp, pea and soybean vines, green corn, vegetable waste, etc. Its combination of low temperature drying and large capacity will save you money on production costs and enable you to turn out a high quality product.

With our 53 years of drying experience for all types of industry, we may be able to add extra profits for you, too. Write for our Type H Dryer bulletin. Or ask for a Louisville engineer to look over your drying operation.



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GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Offices: 139 So. Fourth Street, Louisville 2, Kentucky • 380 Madison Ave., New York 17, New York

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In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario

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and a chute installed between the opening and the man-hole, bags are emptied in a fraction of the time and with little effort.

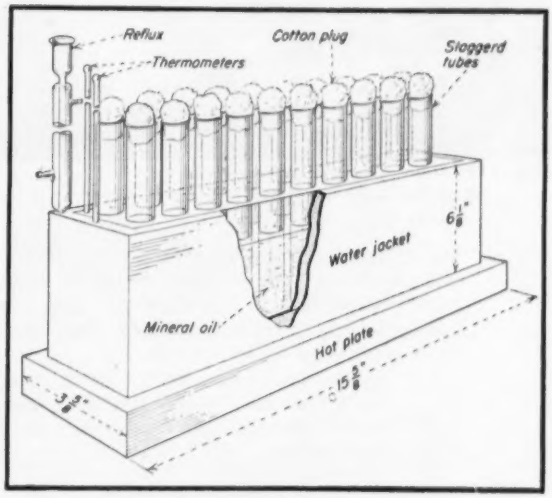
As shown in diagram, assembly consists of a sheet metal chute (A), inclined at an angle of about 45 deg., and a funnel (B), its top flush with the floor. The chute rests on the rim of the man-hole and is pin-connected to the funnel. Pin (C), inserted through aligned holes drilled into the sides of the chute and the bottom section of the funnel, permits chute to pivot. Although trough dimensions vary with capacity, sides must be high enough to prevent spillage.

When a bag is to be dumped, operator places it on the floor with its open end in the funnel. Lifting the other end starts the flow of sugar into the tank. Several sacks may be emptied simultaneously.

When not in use, the chute is swung parallel to ceiling where it is secured by ceiling hooks which fit holes in its sides. Thus, it does not interfere with other operations. As a safety precaution, a cover is placed over the floor opening.

If a drum or barrel is to be emptied, it is rolled into position with its bung directly over the funnel. A strainer, placed in the funnel, traps unwanted sediment.

Equipment may be dismantled quickly for cleaning, or may be washed in place by flushing with hot water.



Simple Oil Testing Method

Here is a practical method for the routine determination of the stability of fatty products such as potato chips, peanuts, etc., which can be made rapidly and easily. Procedure is a simplified version of the Swift Active Oxygen Method.

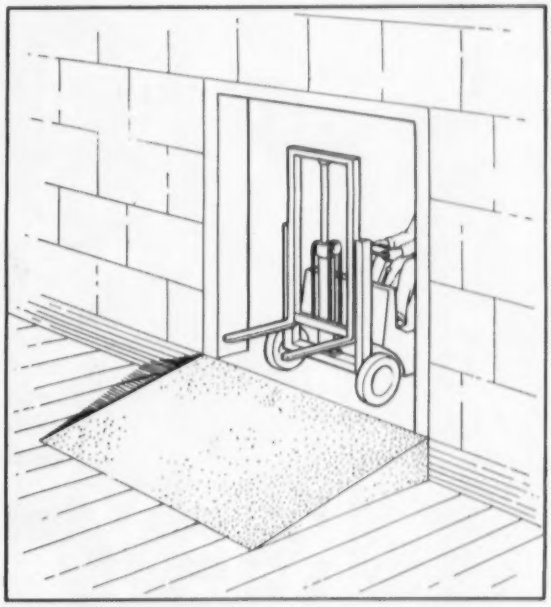
Apparatus (see sketch) consists of a mineral oil bath designed to maintain a temperature of 208 deg. F., a few 24 mm test tubes, and some surgical cotton for plugs.

Product tested is simply crushed, and then a sample of approximately 10 grams of the material is added to the tube, and placed in the bath. It is important that the level of the liquid in this bath be higher than the level of the product in the tube. Then a loose-fitted cotton plug is inserted in the top of each unit.

Product should be observed periodically until rancidity is detected by organoleptic methods. Though there may be some variation among different fat types, usually approximately one hour in the apparatus is roughly equivalent to one day at 100 deg. F.

This procedure may be used in quality control since comparison with a standard is more important than knowing the absolute value of the shelf life. Attractiveness of this method lies in the fact that it is extremely simple and, therefore, an unskilled worker can operate it in the plant without having to have a laboratory to check the product stability.

Oil bath can be fabricated by any sheet-metal shop usually for less than $50.—*Barney Hilton, Head Food Technologist, H. W. Lay & Co. Inc., Atlanta, Ga.*



Non-Skid Ramp for Frozen Warehouse

Like many others that have had additions built on, the frozen food warehouse at J. R. Simplot Co., Caldwell, Idaho, has two different floor levels. The problem of building a ramp that would stand the weight and traffic, and that would not become ice-coated and dangerous to men and equipment was for some time a plaguing problem.

Finally the solution was found in the idea of using a mixture of sand and water as a ramp. This mixture was put in place and trowled to the incline desired. Warehouse for frozen foods is maintained at 0 degrees F., at which temperature the mixture froze to the hardness of concrete, and has remained that way.

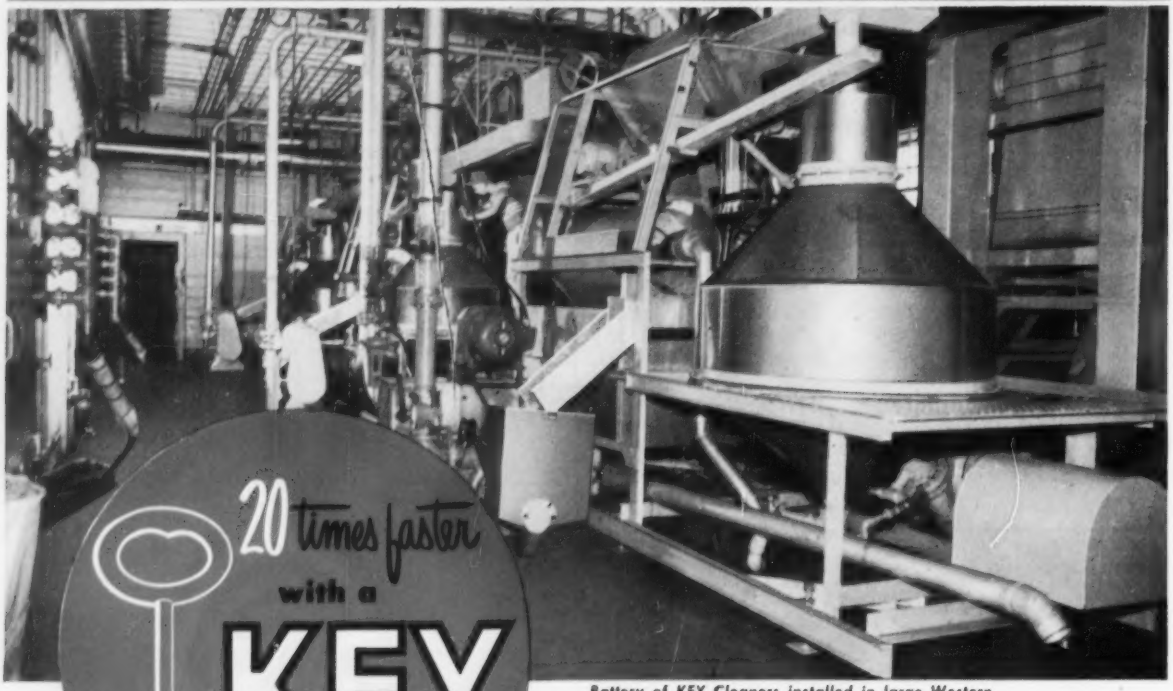
The sand provides a constant non-skid surface which gives up granules of sand just readily enough to prevent the formation of ice on the surface. This frozen sand-water ramp has never broken down and has not required replacement since installation two years ago.

Novel Use for Baking Soda

It will be found excellent safety practice to keep a supply of baking soda available in areas where there is any possibility of a grease fire.

Such conflagrations are readily extinguished by throwing baking soda on the blaze, since this chemical when heated creates carbon dioxide. This heavy gas in turn settles down over the blaze to cut off the oxygen and smother the flames.—*The Conveyor, National Canners Association, Research Laboratories, Western Branch, Berkeley, California.*

SAVE MANPOWER—CUT CLEANING COSTS



Battery of KEY Cleaners installed in large Western frozen food processing plant.

If you are using the sorting belt system of cleaning peas or lima beans, it's time to replace with labor-saving, money-saving KEY Equipment. Not only will your manpower requirements be greatly reduced (KEY cleaner production with only one operator has equalled that of 20-26 sorters), but you will find it unmatched for efficiency in removing waste from product.

The KEY Froth Flotation Cleaner features a completely unique design and operating principle. Through scientific process, waste and foreign material are selectively and automatically separated from the food product.

The KEY Cleaner provides for the highly efficient removal of such waste as nightshade berries, thistle buds, weed seeds and pods from peas and lima beans. This equipment also is readily adaptable to the cleaning of whole kernel corn.

For fast, low-cost cleaning in big volume, install a KEY Froth Flotation Cleaner. Mail the coupon below for full information, or call your nearest FMC representative.

CLIP AND MAIL TODAY FOR YOUR FREE COPY

Descriptive bulletin on the KEY Froth Flotation Cleaner includes diagram of pre-treatment and separation operations.

For prompt reply, address office nearest you:

Food Machinery and Chemical Corporation
Canning Machinery Division

P.O. Box 1120, San Jose 8, Calif.
103 E. Maple St., Hoopeston, Ill.

☐ Please send me a copy of your Bulletin on the KEY Froth Flotation Cleaner.

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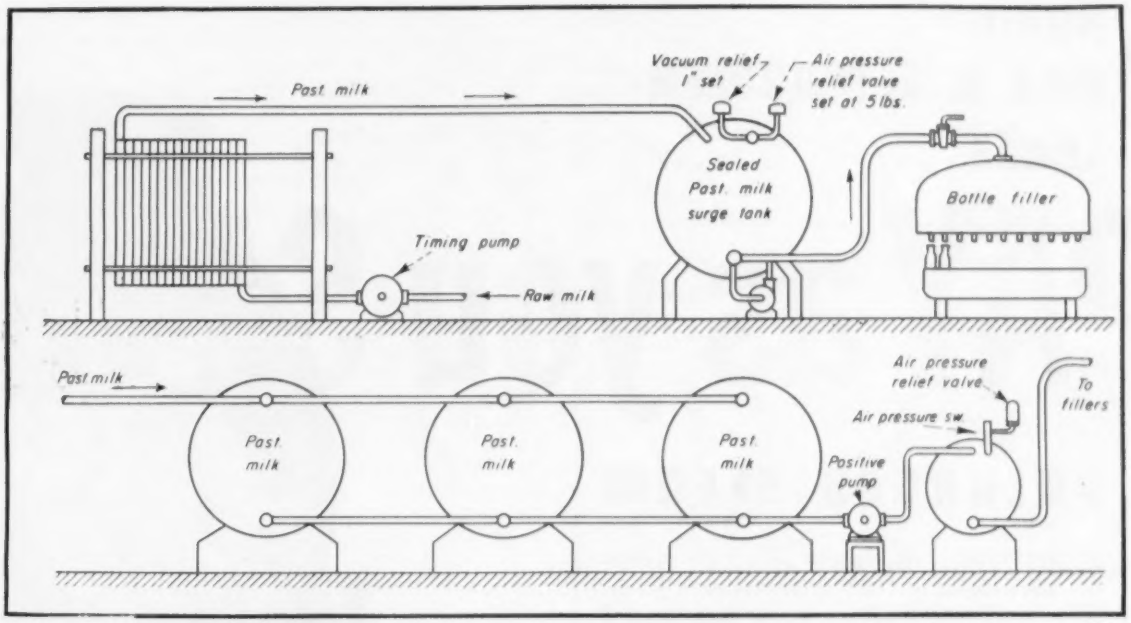


Solves "Air-Pumping" Problem

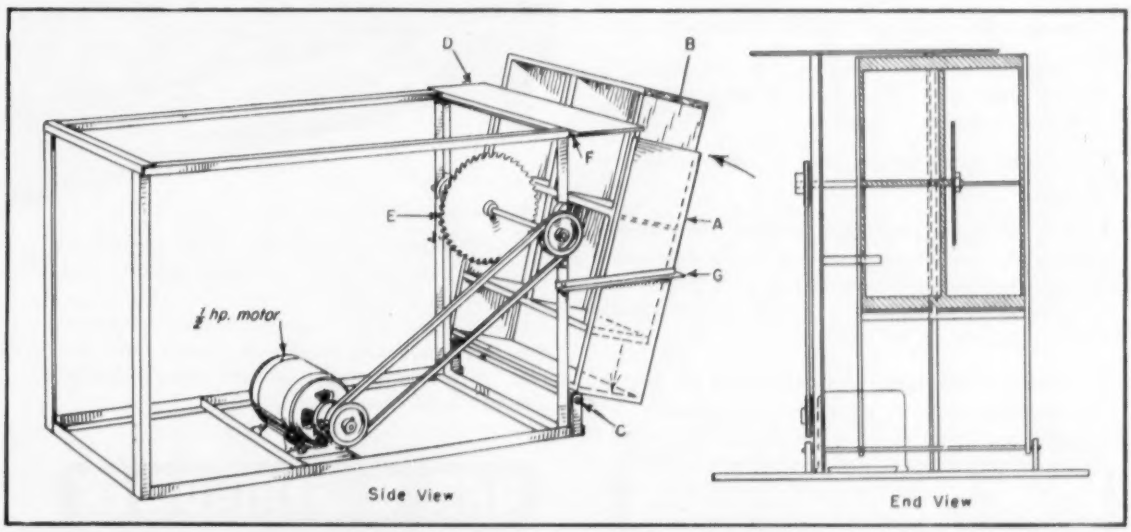
Here is a way to avoid using an air compressor to move pasteurized milk to filling machines—and thereby eliminate the difficulties involved in keeping the air free of bacteria.

In this system, a sealed surge tank is located ahead of the fillers. When milk is pumped into this closed vessel, the air naturally is compressed in the tank above the milk. Pressure can be controlled as desired by using an air-relief valve, as shown at the top. In this system, capacity of the timing pump must be as great, or greater, than that of the bottling operation.

When pumping stops at the end of the pasteurizing run, the milk remaining in the surge tank is pumped out to the plants filling machines. This is done with a small centrifugal pump.

So there should be a vacuum-relief valve in the tank, or you must open the tank to atmospheric pressure, to prevent the tank from collapsing.

Lower drawing shows system used when our bottling operation exceeded our pasteurizing speed. A positive pump was employed, and it had greater capacity than was required by our fillers. A pressure switch on the small sealed tank controlled this pump.—*Leo Greene, Plant Manager, Tuscan Dairy Farms, Inc., Union, N. J.*



Saw Rig Revamps Carton Cases

For the purpose of cutting the latitudinal partition in our carton cases on each side of the longitudinal partition, we designed a special sawing arrangement.

It is now possible to remove the latitudinal partition quickly without causing damage to the rest of the case. This is important since the removal of this partition makes it possible to use the case for 12 bottle cartons, as well as six bottle cartons.

Here's how new arrangement is constructed, and how it works:

Construction was a bin or frame—(A in left sketch) into which the case (B) could be inserted. Container for

Again ORR & SEMBOWER Leads . . .

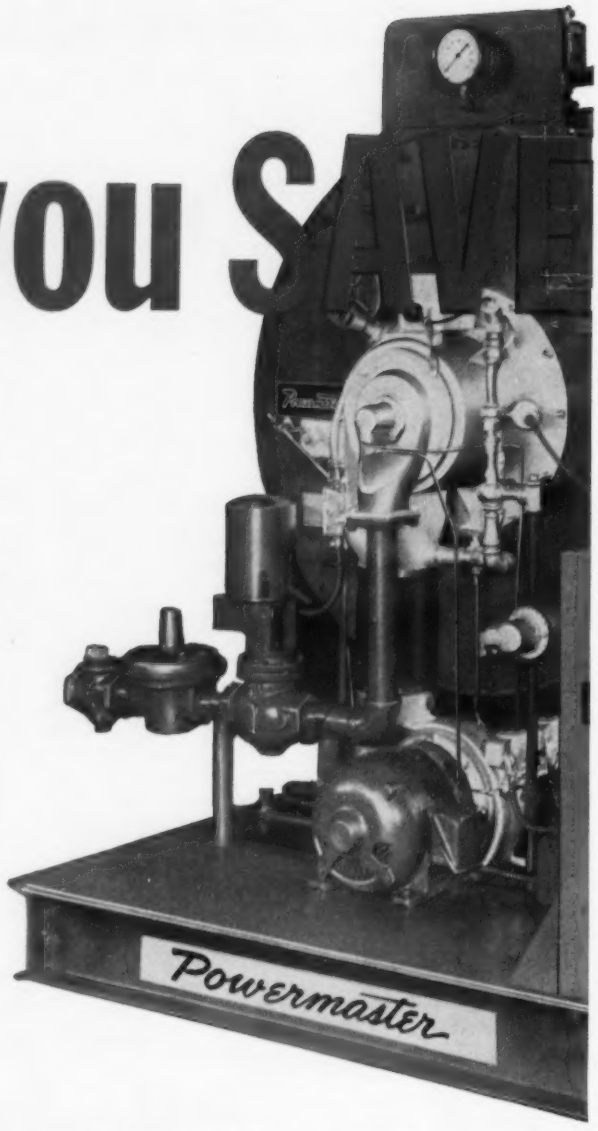
PAY as you SAVE

PACKAGED STEAM

RIGHT NOW is the time to get all the operating advantages of O&S *Powermaster*® Packaged Automatic Boilers *without* high capital investment. Pioneers in the packaged steam field, O&S now offers a new extended payment purchase plan that gives you more and more savings.

HERE'S HOW YOU SAVE:

- Save on fuel and time through real operating efficiency with a *new* packaged steam plan.
- Save on down-time and maintenance expense.
- Save on taxes if your existing boiler cost has been completely amortized. This saving is especially important with the "sum of the digits" method of figuring depreciation provided in the new tax law.
- Save on fuel costs because you can instantly change from gas to oils of any grade to meet delivery or economic conditions.
- Save on space by *Powermaster's* extra-compact design.
- Save on initial investment because you can get *exactly* the size and capacity boiler required for your needs. *Powermaster* is available in a full range of sizes from 15 to 500 hp., 15 to 250 psi. steam or hot water.
- Save on installation costs and time because a *Powermaster* "goes in" anywhere quickly, easily.



WHAT'S MORE—all these savings of direct costs, indirect costs and labor can be yours with little cash outlay. It's true—*Powermaster* virtually pays for itself from savings. Learn more about *Powermaster* and the new Orr & Sembower extended payment plan—write today to Orr & Sembower, Inc., Morgantown Road, Reading, Pa.

Powermaster is your best bet because only O&S offers you undivided responsibility for every package. All components are made in the O&S factory—are guaranteed by Orr & Sembower, backed by more than 85 years reputation.

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Powermaster®

PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP; pressures to 250 psi.

For more information, use coupon on last page.

the case is hinged at (C) so that frame can be swung out to clear the safety guard (D). This latter projection prevents disturbing case while engaged in the saw (E) and also the safety device protects the operator.

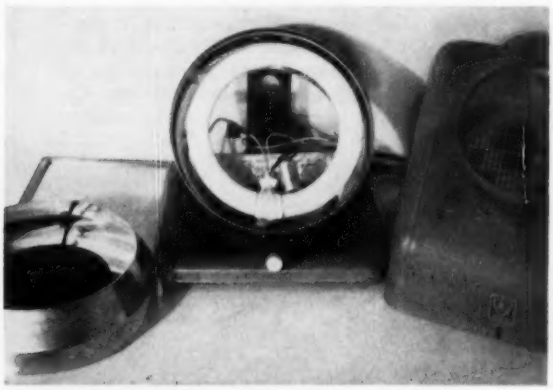
Stops are provided, one stop (F) preventing bottom of the case from being cut by the saw and the other positioning the compartment for receiving the case.

The guard (D) prevents entrance or removal of the case while the compartment is pressed in for engaging the saw.

When the case is in place and the frame is pressed in, the partition of the case is cut on one side (see right sketch). This cut completed, the case is then removed from its frame, up-ended and again replaced in the frame. The other side of the case partition is then cut by pressing on the hinged frame to swing the case against the saw.

The 12-in. saw is rotated at approximately 1500 rpm by a ½ hp. motor which has proved to be powerful enough for this type sawing. The table, guards and case-holding compartment were made mostly of suitable sizes of angle iron and one-eighth inch sheet steel. Also an arbor was made from a piece of steel shaft one inch by 12 inches, and fastened to the end of the table by means of pillow blocks.

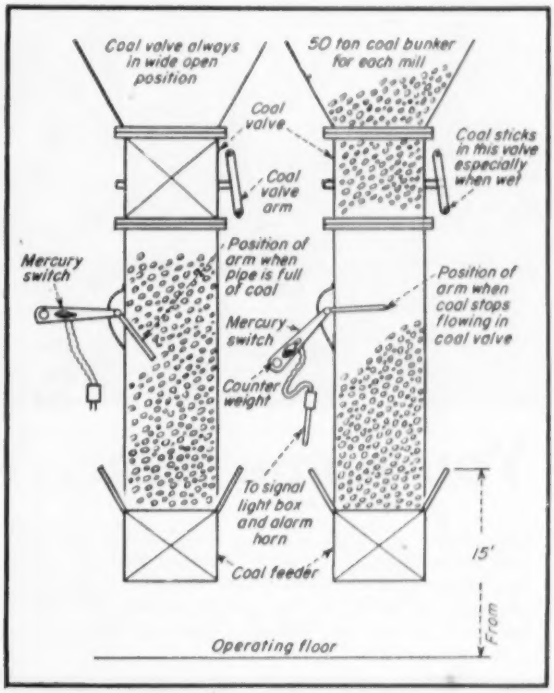
Through the use of this saw arrangement, damage to carton cases is prevented and many working hours have been saved.—*A. J. Morgan, Jr., Norfolk Coca Cola Bottling Works, Norfolk, Virginia*



Improves Colony Counting

We found that during routine bacterial colony counting, using the Quebec Colony Counter, excess heat from the 40-watt incandescent lamp fogged the petri dishes so that many colonies were hidden and, therefore, inaccurate counts resulted.

Then we replaced the incandescent lamp with a 22-watt Circle Line fluorescent bulb. This gives a cool light and does not fog the plates. In addition provided is a brighter and more evenly distributed white light. The parts needed for this installation besides the fluorescent bulb (see photo) are a starter and a power factor ballast which may be mounted in back of the bulb.—*Kenneth M. Rowell, The Exchange Orange Products Co., Ontario, Calif.*


Coal valve always in wide open position
50 ton coal bunker for each mill
Coal valve
Coal valve arm
Coal sticks in this valve especially when wet
Mercury switch
Position of arm when pipe is full of coal
Position of arm when coal stops flowing in coal valve
Mercury switch
Counter weight
To signal light box and alarm horn
Coal feeder
15'
From
Operating floor

Warns When Coal Feed Stops

At the time the alarm system for reporting on clogged coal feed pipes was installed, we had two pulverizers feeding each boiler furnace. These pulverizer-units were fed from 50-ton overhead bunkers through coal valves.

Frequently in our experience, after a few days run, coal would stick in the coal cut-off valve located at the bottom of the 50-ton overhead bunkers.

After passing through the coal valve the coal then travels a short distance to the feeders which supply the coal pulverizers. When clogging took place in the coal valve it required but a very short time until the failure of a supply of pulverized coal to the furnace would cause a loss of ignition. Further, when ignition was lost in one burner the other was very likely to go out also, while complete or partial ignition loss might result in furnace explosions or serious puffs.

With the help of our electricians we rigged up an alarm

CAN YOU USE $50?

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Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

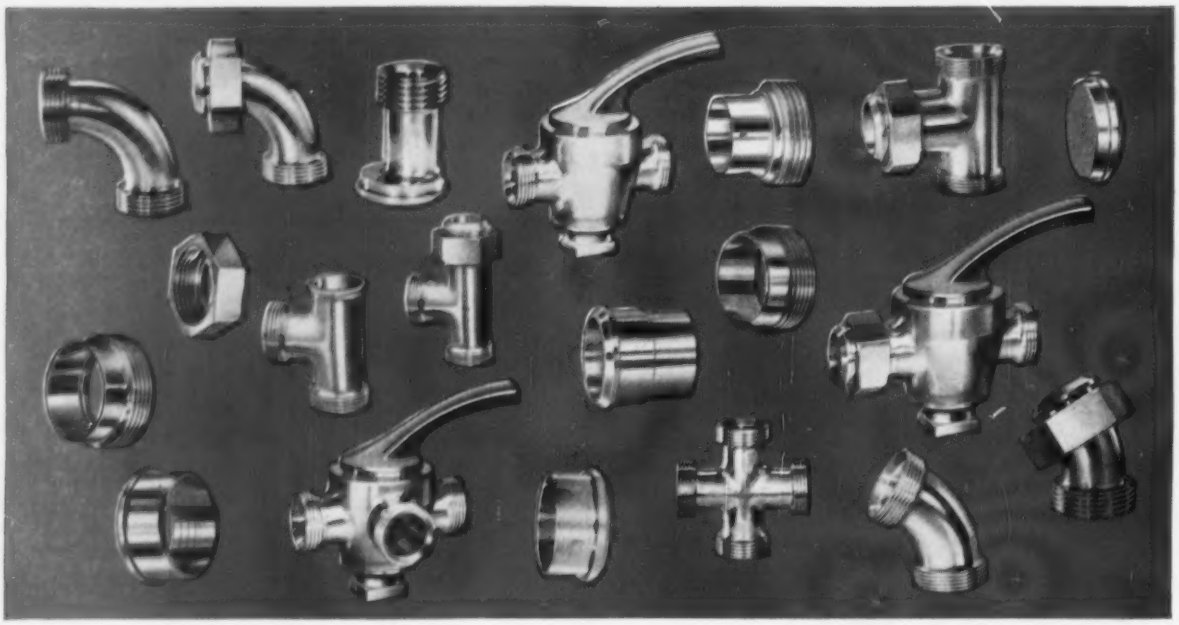
Also, $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you.

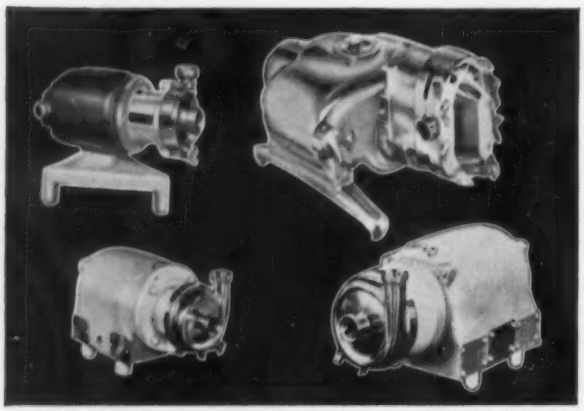
Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors

FEBRUARY PRACTICAL IDEA WINNER was "Screw Conveyor Serves as Grinder," submitted by P. A. Bauchesne, Chemist, Canapro Ltd., Grindstone, Magdalen Island, Quebec, Can.

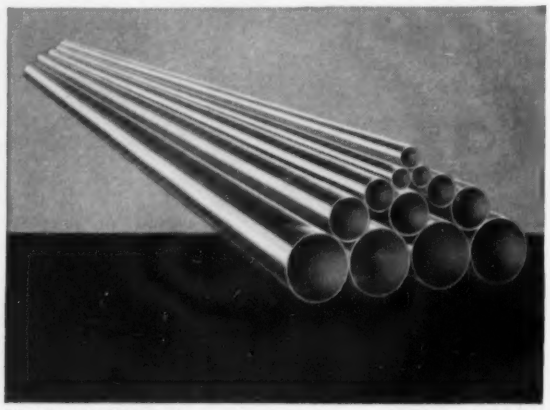


You name 'em...You can have 'em!

One picture, 'tis said, is worth 10,000 words. That's why we're jamming as many stainless steel fittings as possible into the above photo. Without Cinerama we can't get 'em all in. The point is, though, that we do have as complete a line of sanitary fittings as you can find — *anywhere*. Also available, a complete line of C-I-P fittings specifically designed for cleaned-in-place pipelines. What's more, they're *in stock* . . . ready for delivery, from branches and distributors conveniently located throughout the country.



PUMPS? The famous "Flexflo" centrifugal and "Waukesha" positive types are available in 316 fortified stainless . . . in a variety of capacities . . . for pumping against low, intermediate and high pressure heads. ¼ and ½ HP centrifugals and Waukesha pumps also available in stainless nickel alloy. *All in stock* . . . for quick shipment.



NAME YOUR SIZE. Our sanitary tubing . . . *all in stock*. Polished 180 grit I.D. and O.D. Comes in a variety of lengths and sizes: 1-inch in both 20 and 10-ft. lengths; 1½ and 2-inch in 21 and 10-ft. lengths; 2½, 3 and 4-inch in 10-ft. lengths. Other lengths and finishes available on special order.

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Please send ☐ Flexflo Pump Bulletin. ☐ Waukesha Pump Bulletin.
☐ Sanitary Fittings Bulletin. ☐ Have representative call.

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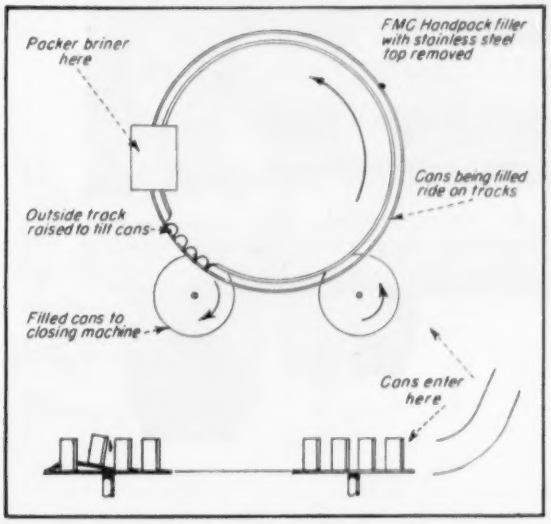
City ..... Zone..... State.....

system which is attached to the coal pipe just below the coal valve supplying the coal pulverizer.

A hole was cut in the pipe and a piece of flat iron inserted, attached to a pivot shaft on the outside of the pipe. Next a housing was provided for the shaft. Then this was attached to the outside of the pipe. Finally, another piece of flat iron was attached to the shaft. This in turn was attached to a mercury switch with the required counterweight.

Now, when coal stops in the coal valve or in the bottom of the bunker, the flat iron piece swings upward and the arm outside is lowered causing the mercury switch to sound an alarm and light a light in an indicator box.

This simple arrangement was installed several years ago on the two 275,000 lbs. per hr. units then in use. We have since placed them on new boiler installations. However, in the latter case we employed stainless steel in the construction of units even though the mild steel with which the former units were constructed lasted several years.—*C. W. Methuron, Chief Power Engineer, American-Maize Products Co., Roby, Indiana*


Packer briner here
FMC Handpack filler with stainless steel top removed
Cans being filled ride on tracks
Outside track raised to lift cans
Filled cans to closing machine
Cans enter here

Correct Head Space Assured

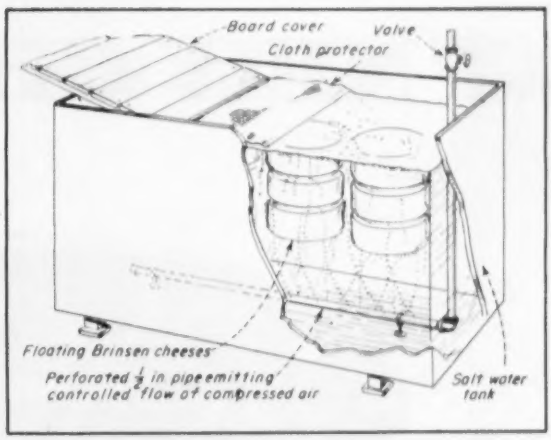
When we added a new product, canned potatoes to our line we faced a few problems apparent costly to solve, but fortunately unraveled quite economically. Since others may face a similar situation, our way of solving the problem is passed on here.

To solve our major problem it seemed necessary to purchase a topper for steam flow conversion for one of our standard can closing machines that we had in use. Instead of making this purchase we found other means of providing correct head space to make steam flow closure effective.

As part of the program we purchased a briner and handpack filler. This latter machine is connected so that the bottoms of the cans rest upon a pair of iron tracks as the cans are moved through the filling operation.

It was found that by raising the outside track at the point where the can has left the briner and just before it is transferred to the discharge plate, the container may be tipped, just enough to spill out the amount of brine necessary to provide the exact amount of head space needed for effective steam flow closure.

Since raising the outside track as described the vacum in our product has been increased from 3-4 to 9-10 in. of mercury.—*L. W. Spain, Plant Engineer, Bozeman Canning Co., Bozeman, Montana*

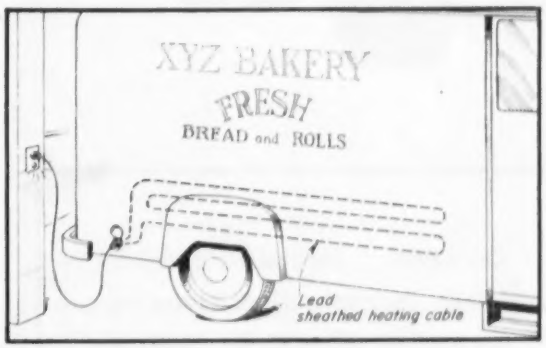


Hand Labor Reduced in Cheese Making

In processing "Brinsen" cheese, made from sheep's milk, only one layer of pressed cheese could be handled in the salting vat at one time, since it was necessary regularly to turn this layer of product to insure equal absorption and distribution of salt in the product. In spite of this required operator attention, salt penetration was not uniform.

Here are the simple improvements made to save labor, speed the operation and improve the product:

Down the center of the salting vat (see sketch) a perforated pipe for compressed air agitation was laid a few inches from the bottom, perforations pointing down. With gentle agitation, the brine is now circulated to reach and uniformly penetrate not one but three layers of cheese. Latter is held submerged under a cover made of wood slats cloth covered.—*G. M. Gurar, Tivon, Israel.*



Heating Units for Bakery Trucks

If bakery products are loaded into a heated truck and kept warm in transit, they arrive at their destination fresher than they would if subjected to chilling.

To insure a warm truck for bakery products, here's a simple procedure: First, install standard G.E. electric heating cable (see sketch) 110 or 220 volts ac. inside the walls of the truck. Next, provide power outlets at or near the loading docks so that heating units in trucks can be plugged in to warm trucks before loading. For safety a double male connecting cable is employed, and a thermostat to prevent overheating.

After loading and in transit truck can be kept warm by any of several standard motor-exhaust heating units mounted inside the truck body or in the floor of the truck.—*Harrie Barnard, Ford Technologist, Clinton Fords, Inc., Clinton, Iowa*

THEY'RE HERE! NEW CHEVROLET

New models . . . more models . . . higher G.V.W. Designed and built the way you can count on Chevrolet, the leader, to build them. Ready to do more jobs. Do 'em faster. Do 'em better. And do 'em with new economy.

Dressed for a new bonus

For the first time in any truck line, *two* distinctly different styling treatments are offered by Chevrolet. One in light and medium models, another in heavy-duty. Each is a new, profitable advertisement-on-wheels for you and your business.

Measured for a new savings

Makes a whale of a difference to get a truck that fits the job. And in Chevrolet you get it! With 75 different models, all having the industry-standard 34-inch frame width . . . 15 wheelbases, ranging to 220 inches . . . three different chassis types, conventional, forward control low cab forward . . . and with maximum G.V.W.'s upped to 18,000 lbs.—Chevrolet's new line of Task-Force Trucks offer the *exact* truck to do the job you

THEY'RE HERE! NEW CHEVROLET

Task-Force TRUCKS

CHEVROLET

need done . . . with operating costs lower than ever!

There's new Overdrive for even bigger gas savings on ½-ton models . . . proved truck Hydra-Matic on ½-, ¾- and 1-ton models—each optional at extra cost. And now, as standard equipment, Power Brakes are featured on 2-ton models (optional on all others) and Tubeless Tires are standard on ½-ton models.

Powered for economy

Whether you deliver door-to-door or haul state-to-state, Chevrolet's *six* new "high-voltage" engines offer the right power-combination for dependable, economical performance on every job. All are of efficient valve-in-head design with high compression ratios. All feature the surer kick-off and bigger generator capacity that only Chevrolet's new 12-volt electrical system delivers.

Chevrolet's new "under-the-hood" features are almost endless. Engine mountings are completely redesigned, cooling and lubricating systems made more efficient, fuel system improved . . . on and on they go, setting a new pattern for the truck industry.

Investigate without delay

So revolutionary are the many new and profitable features advanced by Chevrolet's new Task-Force that truck users everywhere should see their Chevrolet dealer today. Learn the complete story and get started on your way to better trucking. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Task-Force TRUCKS CHEVROLET

For more information, use coupon on last page.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New B. F. Goodrich belt good for 85% of all food-handling jobs

HERE's the most useful conveyor belt made for the food industry. It's the B. F. Goodrich Highseal, built to handle 85 out of every 100 food-handling jobs, and last longer doing them.

The attractive green color is the first thing you notice about this belt. Lighting experts and color specialists call it "sight-saving" green. By reducing glare and eyestrain, the belt literally eliminates headaches on inspection lines.

A new rubber compound gives this B. F. Goodrich belt good resistance to food acids, most greases, fats and alkalies. It can handle cold products down to zero, as well as hot ones up to 212°.

Food particles can't grind into Highseal's smooth, polished surface. That's why it's so easy to clean. Oily foods, sticky icings, even scuff marks from banging pans, wipe right off with a damp cloth.

For those jobs where oil and grease are not a problem, the B. F. Goodrich Kleenseal is the belt to use. It costs less than the oil-resisting Highseal belt, yet has the same green color and all the other advantages.

It will pay you to find out more about these work-saving, money-saving improvements in food-handling belts. Have a BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. *The B. F. Goodrich Company, Dept M-394, Akron 18, Ohio.*

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INDUSTRIAL PRODUCTS DIVISION

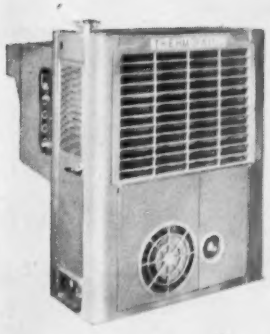
Check First!

before you buy—see why

Thermo King

is tops in truck refrigeration

Exclusive features make THERMO KING outstanding in the field of truck refrigeration. Patented one-piece self contained package . . . patented stop-go engine operation made possible by an integral starter-generator . . . quick action automatic defrost. THERMO KING gives you more refrigeration for your money!



New THERMO KING "pancake" model fits the new cab-over-engine tractor and longer trailer trend in trucking.

U. S. THERMO CONTROL CO.

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Authorized service and genuine parts—from coast to coast!

Practical service training at Honeywell's school . . .

makes your instrument men more valuable

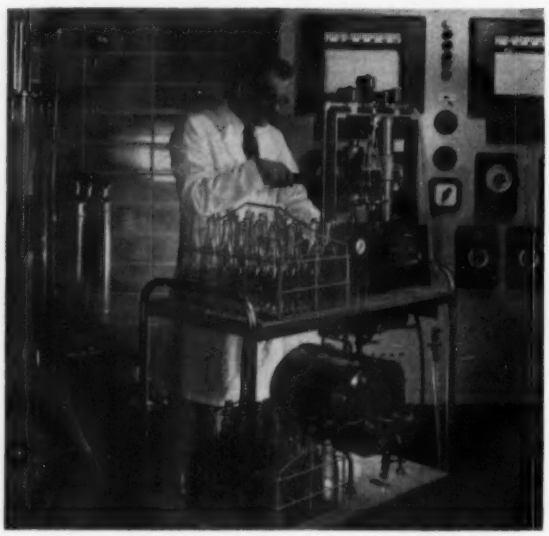
Your instrument maintenance men can get a real education in the most up-to-date methods for servicing instruments, at Honeywell's Training School. Any organization which uses Honeywell instruments can send maintenance personnel to this school. Tuition costs you nothing, for this school is maintained as a "plus-value" service to Honeywell customers.

Thousands of technicians have either started or augmented their instrument knowledge here. A variety of courses is available, to fit men for the particular kind of maintenance problems they may encounter in their specific jobs. The comprehensive course . . . one of the most complete and intensive offered anywhere . . . covers about thirteen weeks. Other courses cover five weeks and less, to offer condensed instruction of either a basic or "refresher" nature to men who can't be spared for extended periods.

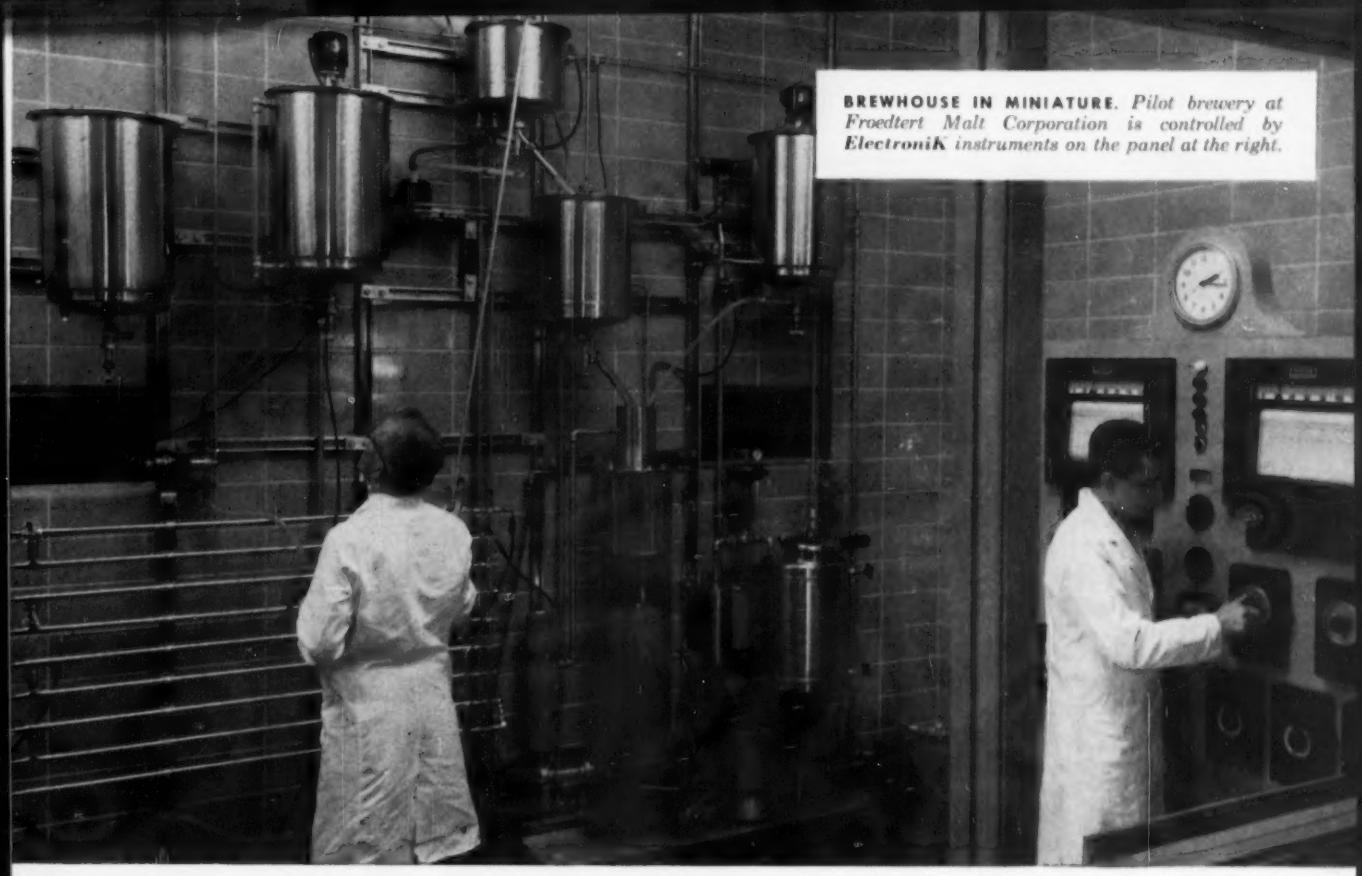
There's nothing academic about this school. The emphasis is placed on practical knowledge. Theory through lectures and textbook study is liberally supplemented by laboratory sessions and actual bench work on all types of instruments and related equipment.

One caution: classes have to be limited to assure thorough attention to all students, so make reservations in advance. Your local Honeywell office will be glad to make arrangements. Call today . . . it's as near as your phone.

*Electronik** instrumentation speeds malt



Portable bottling unit in the laboratory is typical of the pilot-scale duplication of production equipment used in malting research.



BREWHOUSE IN MINIATURE. *Pilot brewery at Froedtert Malt Corporation is controlled by ElectroniK instruments on the panel at the right.*

research in unique pilot brewery

AT THE Froedtert Malt Corporation in Milwaukee, a pilot-scale brewery makes beer by the ounce . . . in order to find new and better ways to make it by the thousands of barrels. An important part of the laboratory techniques used in this malt research program is precise, automatic measurement and control of processing variables.

To fulfill this vital function, the laboratory uses a pair of *ElectroniK* instruments that would be equally at home in a full scale brewery. The instruments are wired so that they can be assigned to whatever phase of the brewing process is under study at the moment. One of them is a program controller, which works with a series of adjustable cycle timers to provide fully automatic, reproducible time-temperature schedules. Cooker and mash tub temperatures, for example, can be maintained at precisely controlled heating, holding and cooling rates if desired, just by making a few simple settings on the instrument panel. Similarly, the complete mashing or pasteurizing schedule can be placed under automatic time cycle control with far greater precision than human operators could attain.

The second *ElectroniK* instrument is an all-purpose recorder of test data. It can chart the rate of wort run-off . . . temperature of wort . . . and other variables detected at various points in the process.

For research men, this installation typifies the extent to which accurate, automatic instrumentation by Honeywell can assume routine burdens of test supervision and data gathering . . . leaving technologists free for more complete utilization of their special skills. For production men, it points to some of the ways that modern instrumentation can safeguard both the quality and efficiency of process operation.

Your local Honeywell sales engineer will be glad to discuss how *ElectroniK* instruments can benefit your research or your production processes. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:** Write for Catalog 1531, "*ElectroniK* Controllers."

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If you're using more than 6 lubricants in your plant, chances are *Pure Oil's multi-purpose lubricants* can cut costs for you. Here's why: just 6 of these special lubricants are all you need—reduces your inventory . . . reduces chance for error in application (and resulting "down time") . . . and the fewer the man-hours needed for ordering, stocking and application.

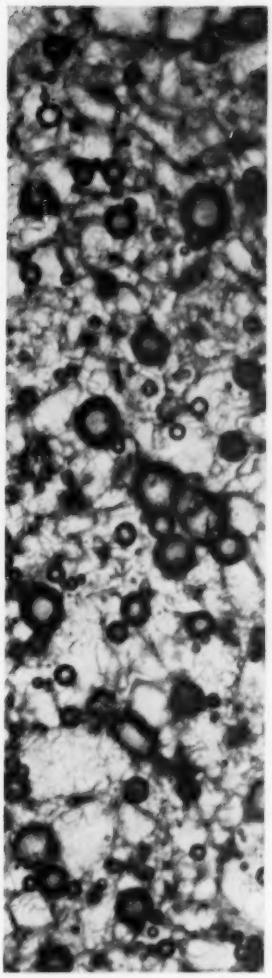
Find out how Pure's multi-purpose lubricants can cut costs in your plant. Reverse the charges to your nearest Pure Oil office today.

FREE BOOKLET tells you "How to Simplify and Save." Write The Pure Oil Company, 35 E. Wacker Drive, Chicago 1, Illinois. (Offer limited to Pure Oil's 24-state marketing area.)

Be sure with Pure **PURE MULTI-PURPOSE LUBRICANTS**

Sales offices located in more than 500 cities in Pure's marketing area

Distilled monoglycerides
and the anatomy of fluff



This is a photomicrograph at 350× of a "butter cream" icing made with Myverol Distilled Monoglycerides.

Anybody with a commercial interest in icings, biscuit fillings, or shortenings for such products has but to give us the word and we shall send him samples of three kinds of *Myverol® Distilled Monoglycerides—Type 18-00*, *Type 18-40*, and *Type 18-85*.

The idea would be for him to try out what proportions of which type do the best job of enhancing the creaming characteristics of the particular fats he wants to use. Put more broadly, how much of which lets his fat entrap and firmly hold the most sugar solution and air—the almost fully saturated *18-00*, the largely unsaturated *18-85*, or the intermediate *18-40*? All three are equally recognized for utter wholesomeness. The choice depends on the ratio between animal and vegetable fats employed, the creaming time permitted, the other ingredients of the mix, processing temperature, and the particular set of conditions likely to beset the product between blending vessel and final triumphal descent down the esophagus.

The doctrine preached here is not that Myverol monoglycerides are the most powerful emulsifiers that money can buy. On the contrary, too thorough emulsification defeats the purpose of the icing and filling maker. He does not want the finest attainable dispersion of aqueous phase into lipid phase. He wants the course of the emulsification arrested and frozen at a relatively early stage when there is still a goodly volume of air to contribute fluffiness. He wants this microstructure to have a certain mechanical strength, not too much and certainly not too little. Of macrostructure he wants a minimum, of course, so that emulsification must be advanced enough to justify the pleasant words "creamy smoothness." All in all, a fine balance that the monoglycerides appear best fitted to provide.

The difference between monoglyceride preparations in general and the molecularly distilled type we make is largely one of cost. Strange as it may seem, the highly purified Myverol kind costs less to use than mono-di reaction mixtures. This, we admit, is hard to believe. The only way to prove it is to run some experiments with our samples and put down a few figures on paper. ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

DPi

Also...vitamins A and E

Distillation Products Industries *is a division of* **Eastman Kodak Company**

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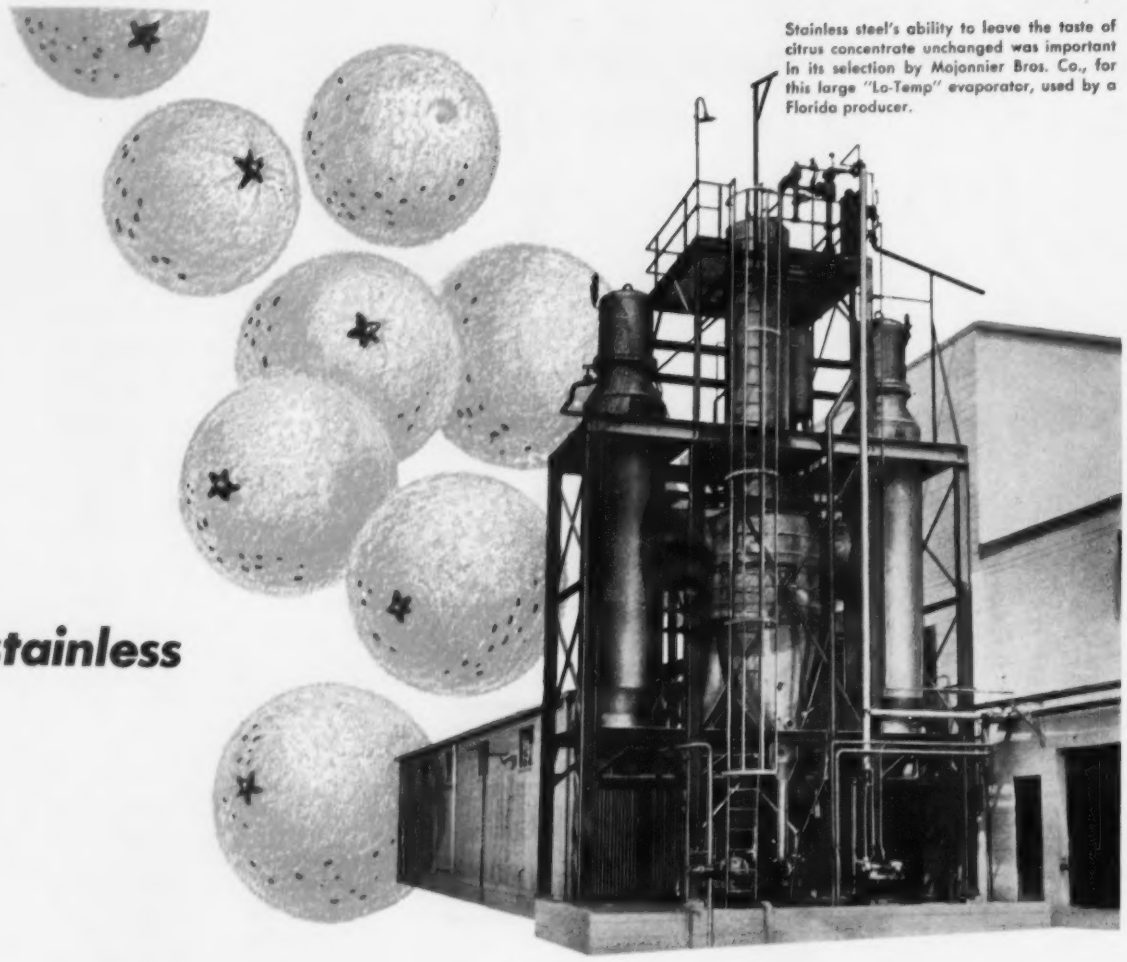


Stainless steel's ability to leave the taste of citrus concentrate unchanged was important in its selection by Mojonnier Bros. Co., for this large "Lo-Temp" evaporator, used by a Florida producer.

stainless

makes frozen juice concentrate **taste good**

FREE—Send for your personal copy of "Making the Most of Stainless Steels in the Food Processing Industry." It will help solve many of your materials selection problems. And, for detailed information on stainless in *Dairy, Brewing, Meat* and *Soft Drink* Industries, ask for the specific Crucible books covering them.

Without stainless steel, chances are the great and growing citrus concentrate industry would not exist. That's because stainless, being easy to clean, cuts down chances of microbial growth . . . successfully resists attack by fruit juice acids . . . does not affect the distinctive flavor of citrus juices.

And that's why Crucible Rezistal® stainless steel is liberally used in such processing equipment as the Mojonnier Bros. Lo-Temp Evaporator, shown here installed in the plant of a Florida citrus concentrate processor.

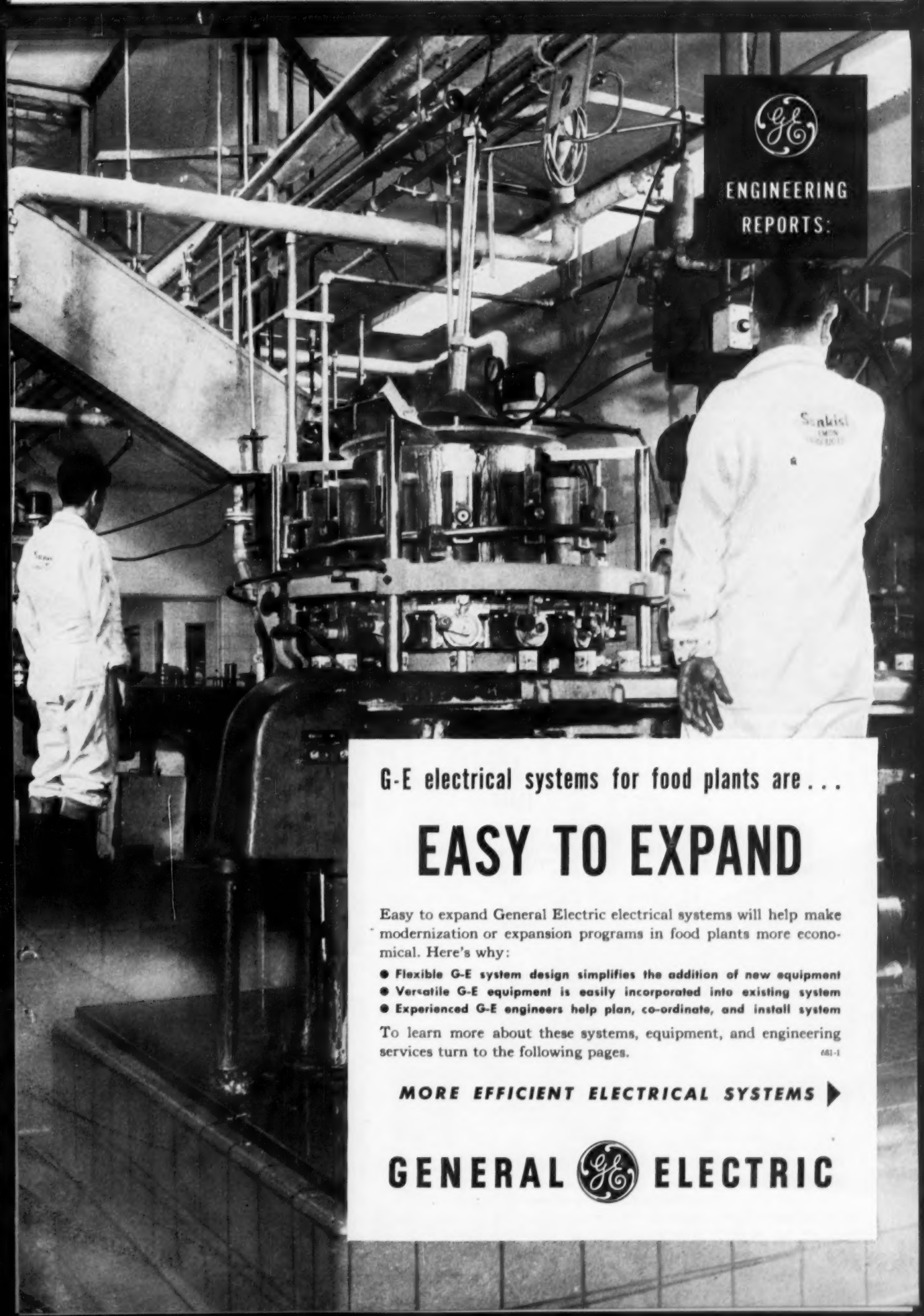
Of course, Crucible stainless steel handles many other foods, too. In vegetable and fruit processing . . . for meat and fish packing . . . vegetable oil refining . . . milling, baking, candy making . . . and many, many more — stainless sets the pace as the *preferred standard* for long equipment life with no effect on the product.

Remember, too: Crucible stainless steel is *really practical* to work with. You can bend it, shape it, weld it, machine it — make any equipment, no matter how complex, out of Crucible stainless. But let us help you decide how to put stainless steel to work for you. For fast action — call Crucible.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.



G-E electrical systems for food plants are . . .

EASY TO EXPAND

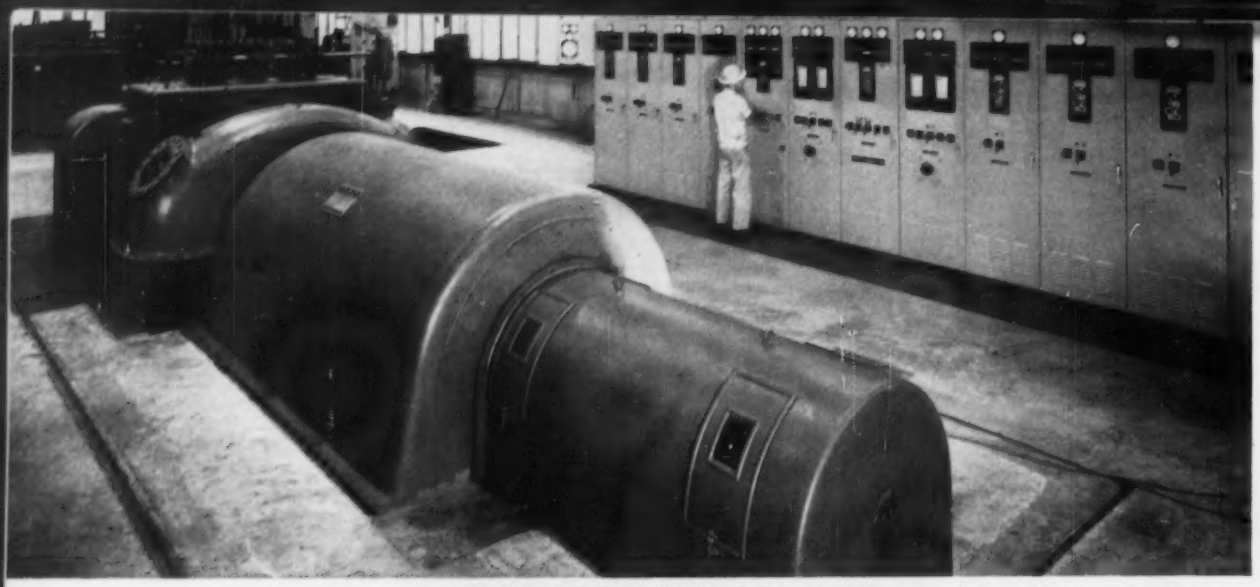
Easy to expand General Electric electrical systems will help make modernization or expansion programs in food plants more economical. Here's why:

- **Flexible G-E system design simplifies the addition of new equipment**
- **Versatile G-E equipment is easily incorporated into existing system**
- **Experienced G-E engineers help plan, co-ordinate, and install system**

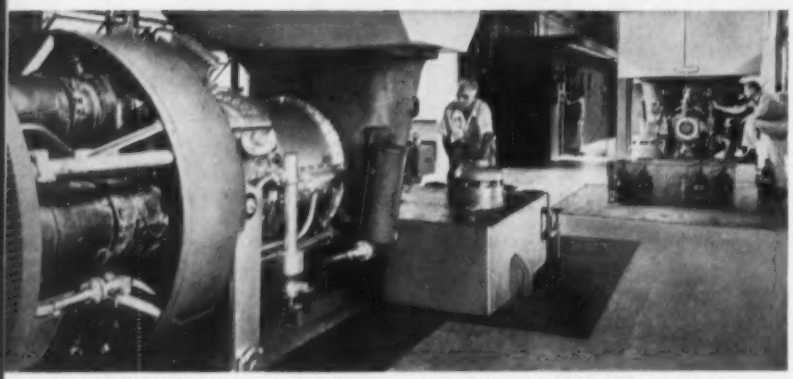
To learn more about these systems, equipment, and engineering services turn to the following pages. 661-1

MORE EFFICIENT ELECTRICAL SYSTEMS ▶

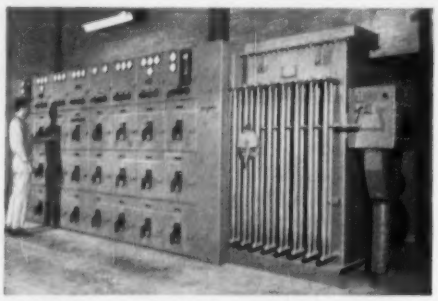
GENERAL ELECTRIC



UTILIZING PROCESS STEAM, G.E.'s complete range of steam turbine-generators provide electric power as a by-product, help maintain plant steam balance.



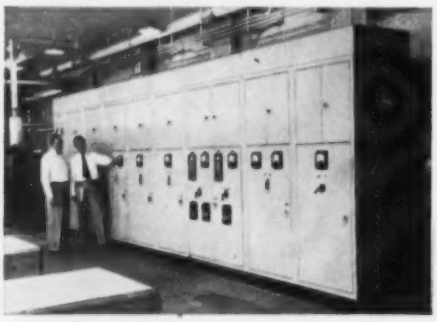
DEPENDABLE G-E gas turbines range from 6700 to 1700 hp. More than 55 units utilize exhaust heat for power generation and mechanical drive applications.



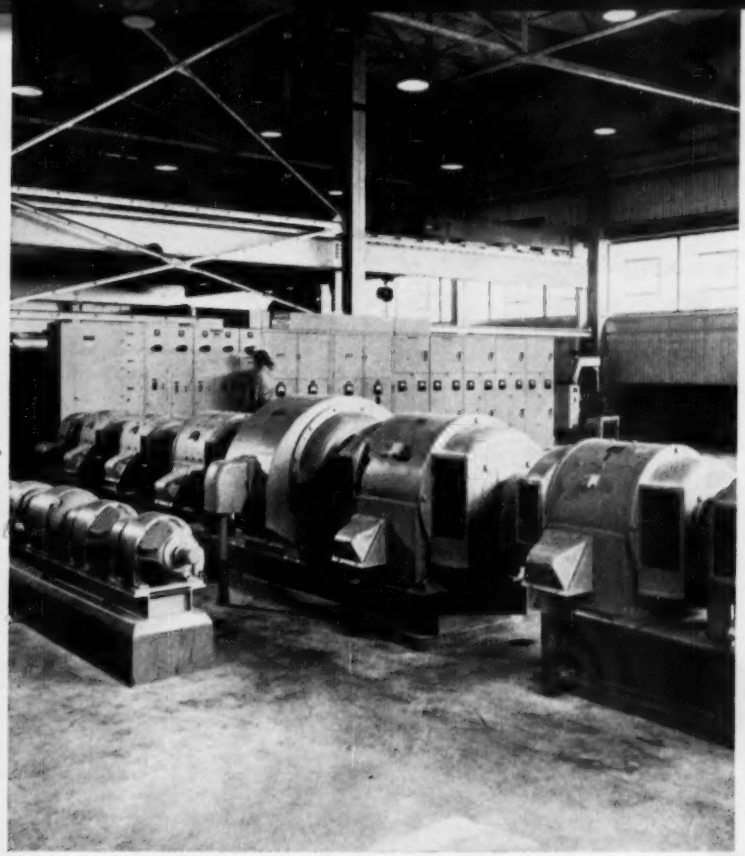
FACTORY ASSEMBLED G-E load center unit substations help cut installation time.

COMPLETE, COMPACT, G-E motor control centers provide centralized control in load areas.

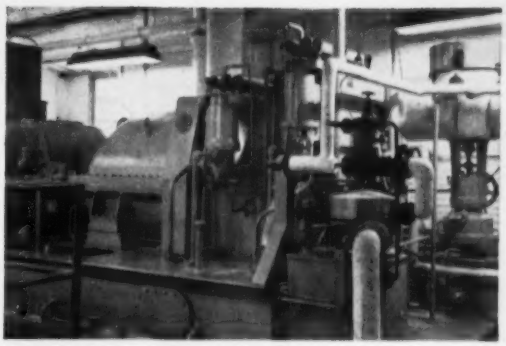
MORE RELIABLE POWER DISTRIBUTION is available with G-E package substations which use co-ordinator transformers, metal-clad switchgear.



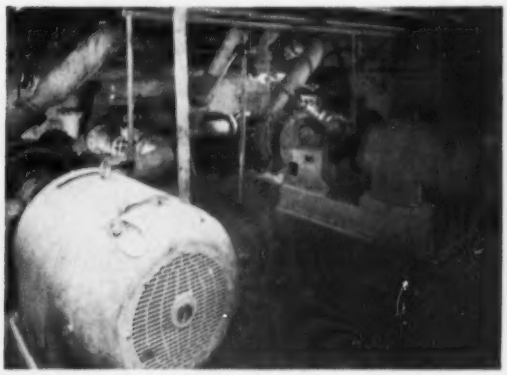
SAVE FLOOR SPACE with compact G-E Limit-amp control units.



DEPENDABLE G-E d-c motor generator sets are designed to operate in continuous service at top efficiency. Minimum of maintenance is a key feature of these sturdy generators built for long life.



ECONOMICAL MAINTENANCE is a key feature in design of G-E mechanical drive turbines.



RUGGED CONSTRUCTION of G-E Tri-Clad* motors make them ideal for all types of drive operations. Polyex insulation in motors 100-3000 hp gives 50% longer motor life.

*Reg. Trademark of General Electric Co.

G-E engineering services, equipment can give you . . .

More efficient electrical systems

MODERNIZING, EXPANDING, BUILDING? Whatever your plans, let experienced G-E engineers help plan a more efficient electrical system for you. They will work with you or your engineering contractors to give you correct answers to the following questions.

SHOULD YOU GENERATE OR PURCHASE POWER? G-E engineers will help make a "load" survey of your facilities, and recommend an economical solution to your particular power supply problem.

WHAT TYPE ELECTRICAL DISTRIBUTION SYSTEM SHOULD YOU INSTALL? The latest distribution system concepts will be reviewed with you by G-E engineers. They will help select and design a modern system to meet your individual requirements.

WHAT KIND OF DRIVE EQUIPMENT SHOULD YOU USE? Each application for drives in your processing lines will be individually examined by G-E engineers to assure that the proper drive is designated for the job.

WHERE CAN YOU UTILIZE AUTOMATIC CONTROLS? New developments in the field of automatic controls will be applied throughout your processing lines by G-E engineers.

Let your General Electric Apparatus Sales Representative get you detailed answers to these and other electrical questions. Contact him at your nearest G-E Apparatus Sales Office early in your planning stages. General Electric Company, Schenectady 5, N. Y. 681-3

PROTECT YOUR EQUIPMENT INVESTMENT ▶

Engineered Electrical Systems for Process Industries

GENERAL ELECTRIC

SIX G-E ENGINEERING SERVICES . . .

HELP YOU PROTECT YOUR EQUIPMENT INVESTMENT

1 **G-E APPLICATION ENGINEERING** helps you and your consultants design the right electric system for your plant.

2 **G-E ANALYTICAL ENGINEERING** helps attain the optimum electrical system for your application. Engineering experience backed up by electronic system analyzers save valuable design time.

3 **G-E PRODUCT DEVELOPMENT** laboratories design and test new equipment under tomorrow's conditions to meet your future demands.

4 **G-E FIELD-SERVICE ENGINEERING** helps you supervise installation, expedite start-up of your major electric equipment.

5 **G-E MAINTENANCE SERVICE** from 31 G-E Service Shops will repair and uprate your old equipment, help establish productive maintenance of your equipment, furnish emergency service.

6 **G-E PROJECT CO-ORDINATION** means on-time engineering, shipment, installation of your electric equipment from preliminary diagrams through start-up.

These valuable services are available to you with General Electric equipment. Contact any General Electric Apparatus Sales Office. Meanwhile, for the full story of G-E engineering services, write for brochure GED-2244, General Electric Co., Sect. 681-3, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Are you on the dieter's shopping list?

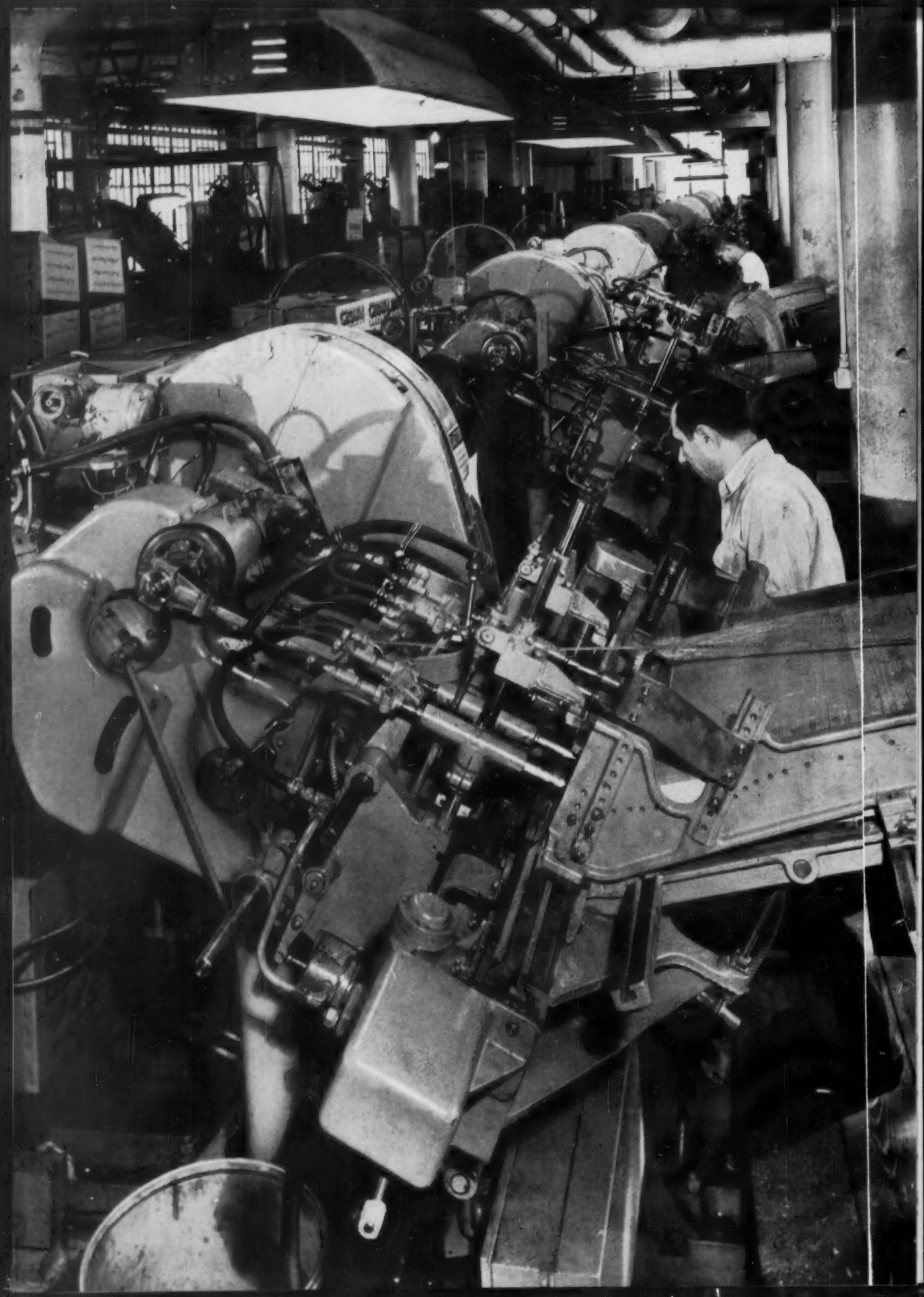
Many dieters can't (or won't) use sugar-sweetened products! They know SUCARYL*—they've used it in their homes. They'll buy—actually shop for—your* SUCARYL*-sweetened line.*

If your product is on the nix list of those who *want sweetness without calories* in their controlled diets, get them back in a hurry with a new line sweetened with SUCARYL.

For SUCARYL offers all the clean, pure sweetness of sugar, without the calories—and without the bitterness or clinging, sharp taste of other synthetic sweeteners. And SUCARYL—an entirely new sweetening substance called Cyclamate—will adapt readily to your processing methods.

Check on it. But do it soon—while the big and busy diet market is forming new brand buying habits. Start with our free new SUCARYL descriptive book. Write: Chemical Sales Division, Abbott Laboratories, North Chicago. Abbott

Stop the diet shopper with **SUCARYL**®
(Cyclamate, Abbott)



Crown Cork & Seal doubles closure output rate... reduces metal waste with Hamilton strip feed presses

By replacing 24 old strip feed presses with 15 new Hamiltons, the Crown and Closure Div., Crown Cork & Seal Company, Inc., Baltimore, Md., has both doubled closure output and reduced scrap loss. They've found their Hamilton investment has paid off.

With the demand for metal closures growing greater and greater, Crown Cork was faced with rebuilding and adding to their old line or investing in a complete new one. A thorough study of this problem revealed two things. Only a complete modern line could meet increased capacity . . . and Hamilton 401 high-speed, automatic strip feed presses offer the most up-to-date features that assure high output with minimum waste:

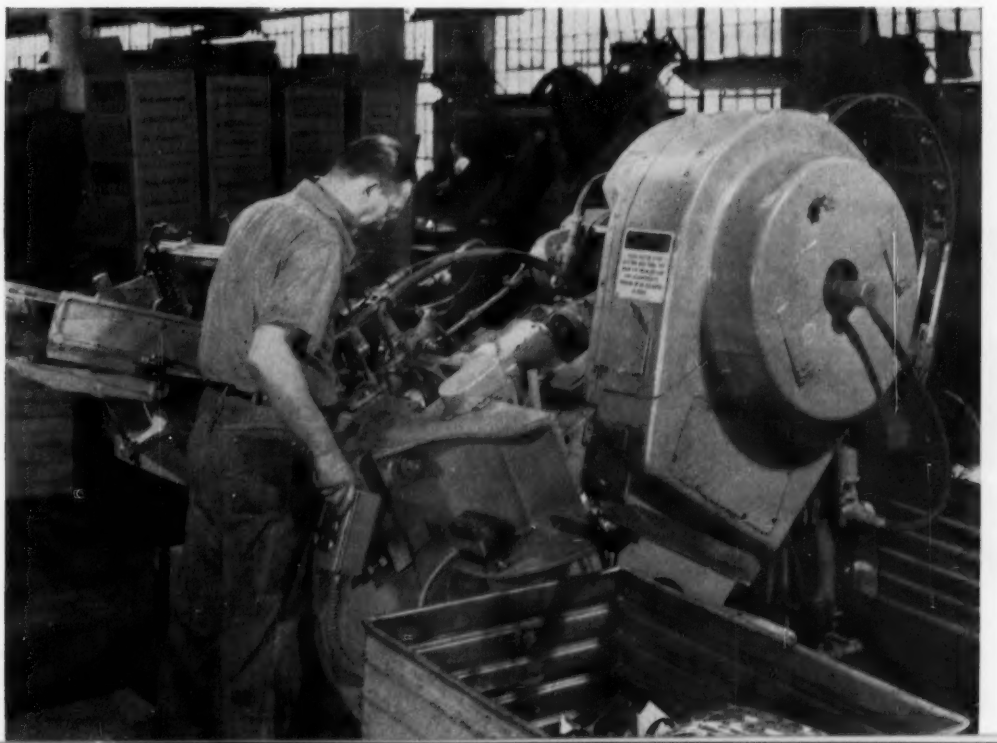
1. Increased production, less waste with multi-die operation.
2. Longer tool and die life due to rugged frame design which keeps alignment true.
3. Low maintenance costs due to clutch and brake arrangement.
4. Full die protection and smooth starting because of automatic stops.
5. 1-hour production run before necessary reload.

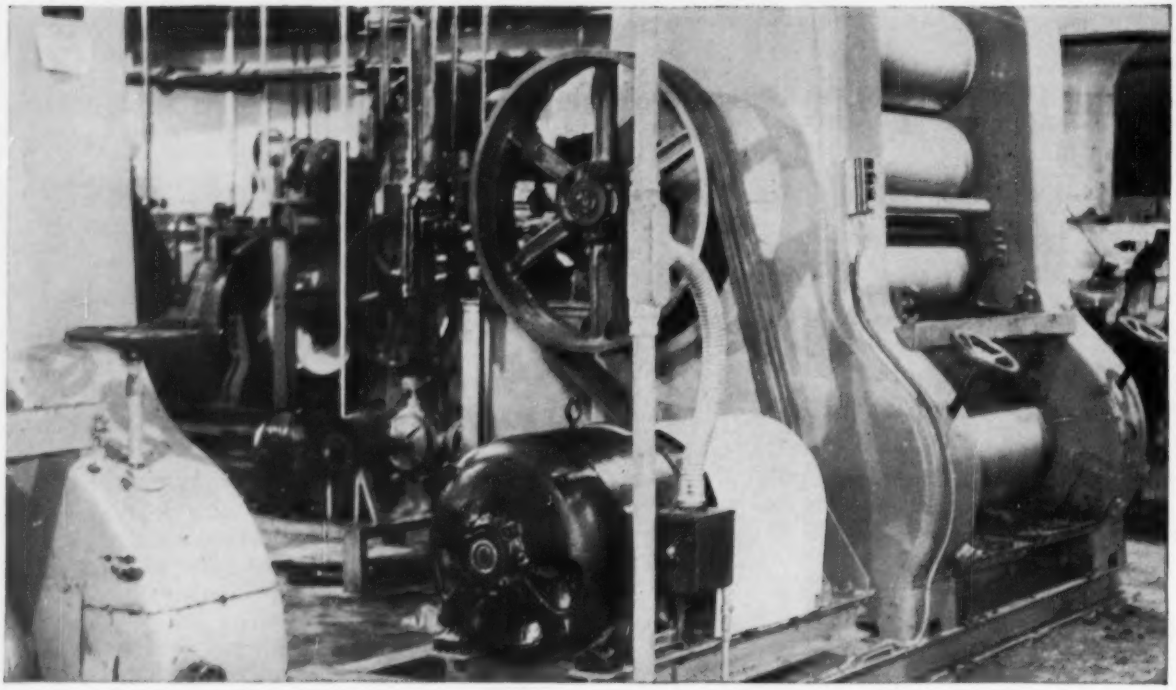
You too will find efficient, economical Hamiltons are geared to meet today's growing demand for high-speed production. For more information on how the 401 Hamilton Strip Feed Press and other machines in Hamilton's complete line of can-making equipment can give you faster production at lower unit costs, please address Hamilton Division, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.

BALDWIN BLH LIMA-HAMILTON

Hamilton Division, Hamilton, Ohio

BALDWIN-LIMA-HAMILTON



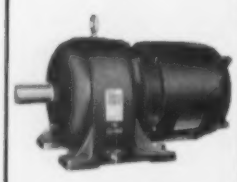


Let each job select

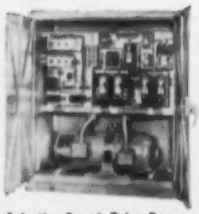
Century **MOTORS ARE Performance-Rated®**

Why settle for *less* motor than you need? Or why pay for *more* motor than you can use? The most efficient and economical motor is one that is fitted to its application ... A Performance-Rated Century Motor.

Performance-Rating means simply that from

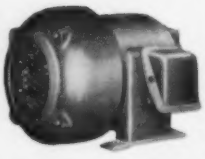


Gearmotors ... ⅛ to 150 H.P. ... parallel and right angle shaft ... "built-in speed to fit your need."

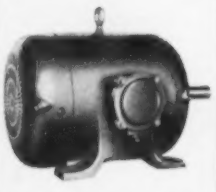


Selective Speed Drive Power Unit ... 1 to 150 H.P. ... a wide range of flexible speed for automatic operation and where fine increments of speed are required.

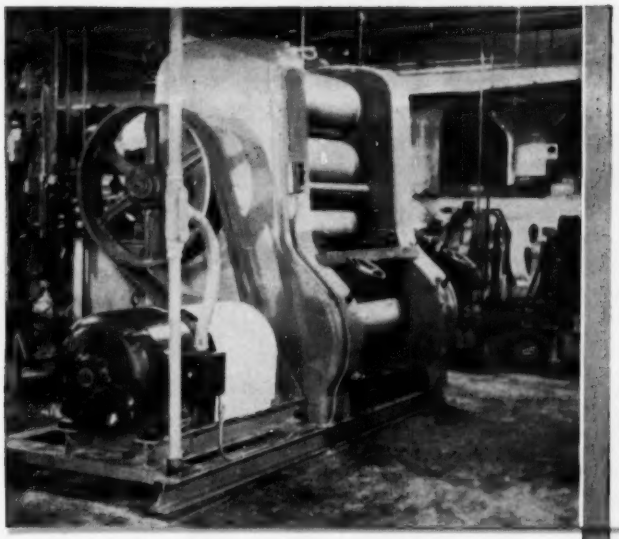
Direct Current Motors ... ⅛ to 300 H.P. ... a dependable teammate for Selective Speed Drives and where DC is available and its use desirable.



Squirrel Cage, Polyphase Motors ... ½ to 400 H.P. ... available in drip proof and dust proof frames, with sleeve or ball bearings, foot or flange mounting (cushion base available through 5 H.P.).



Explosion Proof Motors ... 2 to 50 H.P. ... Underwriters Laboratory listed for safe operation in hazardous atmospheres.



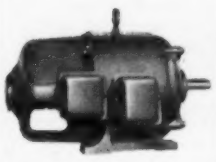
for example: Five-roll refiners are powered by rugged 60 H.P. Century Performance-Rated Motors, chosen to stand up under punishing loads.

Century Motors for Modern Ideas . . . AC or DC . . . Single-phase or Polyphase . . . drip proof, dust proof or explosion proof frames.

its own motor!

TO FIT YOUR SPECIFIC NEEDS

Century's complete line of motors and generators you'll get precisely the right size, speed, frame enclosure and torque characteristics you need. Century application engineers or Authorized Century Distributors are always available to help you fit a Performance-Rated Motor to your job.



Slip Ring Motors . . 1 to 400 H.P. . . . a favorite for applications requiring unusually low starting current. Available in drip proof, splash proof and dust proof frames.

Performance-Rated® Motors

1/8 to 400 H. P.

FOR THE FULL FACTS ON CENTURY PERFORMANCE-RATING, MAIL THIS COUPON TODAY

To CENTURY ELECTRIC COMPANY
1806 Pine Street, St. Louis 3, Mo.

Please send me information about

.....

Name..... *Title*.....

Company.....

Address.....

City..... *Zone*..... *State*.....

Offices and Stock Points in Principal Cities

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri

For more information, use coupon on last page.

Satisfaction rests on the carton

The first requirement of a good shipping container is *protection*—and The Procter & Gamble Co., maker of Crisco, knows by experience that Union corrugated containers are dependable. Another important consideration is *merchandising effectiveness.* Good design and good printing combine to make this box a winner.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

Make sure the screw conveyors you buy pass this quality test!

If they don't . . . investigate LINK-BELT's sound engineering and quality manufacture . . . your assurance of top performance

1. Is flighting accurately formed?

Link-Belt's specialized machinery assures accurate forming, producing uniformity of flighting curvature.

2. Are diameters uniform?

Only specially selected steels are used to meet Link-Belt's rigid specifications.

3. Will the hangers match your exact needs?

Hangers are available in gray iron or steel frames in a range of styles and with various bearing materials.

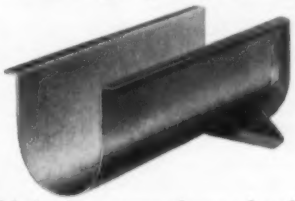
4. Will installation be easy?

Straightness is checked before shipping, and extra care is taken in handling and loading. Jig-drilled coupling bolt holes facilitate assembly.

5. Can gates be installed on the job?

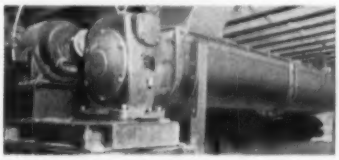
Gates are available for bolting or welding in place right on the job for ease of trough opening location.

6. Are troughs fabricated to your specifications?



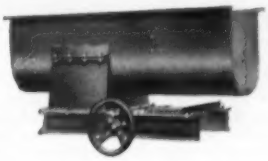
Link-Belt's accurate fabrication assures better fit of all components. Choice of metals to fit your need.

7. Is the drive fully integrated?



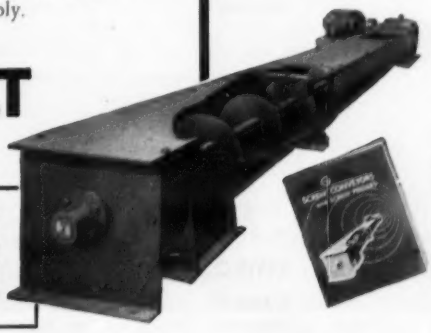
Only Link-Belt builds a complete line of gear and chain drives, couplings, bearings, shafting.

8. How wide a choice of spouts and gates do you have?



Discharge spouts and gates can be fixed or detachable. Hand or rack-and-pinion, flat or curved slide gates.

9. Is full ordering information readily available?



Link-Belt's 92-page Screw Conveyor Book 2289 contains complete ordering data. Ask your Link-Belt representative or distributor for your copy today.

LINK-BELT

13,939 **SCREW CONVEYORS**

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more information, use coupon on last page.

what is your PULVERIZING problem?

we'll test grind a sample for you

with the

SCHUTZ-O'NEILL

Superfine

PULVERIZER

What is your milling problem—uniformity? fineness? Do you need increased output at a lower cost? Without obligation to you, we'll grind a sample of your material in our pilot plant, using a production model Schutz-O'Neill "Superfine" Pulverizer. We'll return your processed product with our Engineering Test Report giving exact data and including recommended Schutz-O'Neill equipment, methods and mill plans for your job.

This will give you full information on the versatility, particle size range and capacity of Schutz-O'Neill "Superfine" Pulverizers. Backed by more than 60 years of continuous manufacturing and field experience.

SCHUTZ-O'NEILL PILOT PLANT uses a standard production model 16" Superfine Pulverizer. Mill components on wall at left in photo provide up to 100 different pulverizing set-ups, with a range from 40 mesh to 5 microns.

Below are two typical pulverizing problems that were solved by SCHUTZ-O'NEILL

No. 1 Pulverizing 200-Mesh Cocoa Powder

THE PROBLEM: Continuous production of 99.5% minus 200-mesh medium and high butter fat cocoa powder. Material is heat sensitive and begins to cake at temperatures prevailing in dry material pulverizers.

THE TESTS: Schutz-O'Neill Company, based upon many years' experience in pulverizing cocoa powder, ran extensive pilot plant tests on cocoa powder containing 16% and 22% b.f. Exhaustive study of the problem, and evaluation of results of the pilot plant runs indicated continuous production of 200-mesh 16% b.f. powder was practical when temperature of feed material did not exceed 70° F. Continuous production of 200-mesh, 22% butter fat cocoa powder was practical with refrigeration equipment lowering temperature of grinding chamber to 35° F.

RESULT OF TESTS: Three major chocolate companies in the United States now use Schutz-O'Neill Superfine Pulverizers for high quality, extra fine breakfast cocoa production.

No. 2 400-Mesh Powdered Sugar

THE PROBLEM: Capacity production of extremely fine powdered sugar (all finer than 400-mesh) for one of the country's major sugar refiners.

THE TESTS: Schutz-O'Neill conducted a 24-hour continuous production run in their pilot plant with pulverizer set to produce sugar with a top size of 40 microns, for use in a new fondant-type sugar. Analysis of pilot plant material in sugar refiner's own laboratory and by impartial University specialist showed product to meet specifications. The mass mean particle size analyzed to average 12 microns, with 99.8% minus 40 microns.

RESULT OF TESTS: A Schutz-O'Neill 28" Superfine Pulverizer is now used for regular production of 400-mesh powdered sugar by this refiner.

WHAT IS YOUR PROBLEM? Write Schutz-O'Neill—take advantage of their 60 years experience in solving pulverizing problems.

Write Us:

Tell us the stock you want to pulverize, fineness, capacity desired; we'll send shipping instructions. Or, write for literature desired on Schutz-O'Neill Pulverizers, Granulators, Roller Mills, Sifters, Cyclone Collectors, Hammer Mills.

ESTABLISHED 1893

SCHUTZ-O'NEILL COMPANY

PULVERIZERS • GRANULATORS • ROLLER MILLS • CYCLONES • SIFTERS • HAMMER MILLS

309 PORTLAND AVENUE • MINNEAPOLIS 15, MINNESOTA

MACK'S GOT IT!

THE ULTIMATE IN C.O.E. DESIGN

only MACK cab-forward design

Built in sizes from 20,000 lbs. to 28,000 lbs. G.V.W. as straight trucks, and as a tractor in the 40,000-53,000 lbs. G.C.W. range.

UTMOST COMPACTNESS

Twelve inches shorter overall length than other C.O.E. designs . . . Up to 50 inches shorter than conventional types . . . Saves a foot in overall length for any given size body or tractor-trailer combination . . . Permits a foot longer body for same overall length as other make C.O.E.'s.

GREATER MANEUVERABILITY

Shorter turning diameter . . . Easy steering . . . Simple, convenient controls . . . Better ability to get in and out of tight quarters . . . Easier handling in heavy traffic . . . For example, with cab-to-rear-axle dimension of 81½" turns can be made in a 34-ft.-diameter circle.

MAXIMUM PAYLOADS

Light chassis weight consistent with Mack quality standards, plus basic design that puts more of the chassis weight on the front, permits maximum payloads . . . Greater bulk capacity, too, because of compactness.

best fills all 10 basic C.O.E. requirements

UNEXCELLED VISION

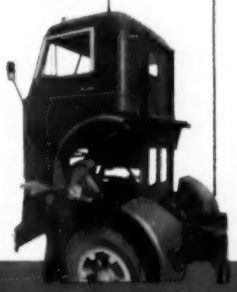
In all directions, right, left and downward. "Picture Window" windshield and big windows in wide doors afford maximum vision and greater safety of operation . . . Even a child close to the front of the truck can be readily seen . . . Unusually clear view of curb for easy parking and maneuvering.

DRIVER COMFORT

Improved seats and driver's position in a wide-door cab that's insulated, fully ventilated, easily heated, and fume-proof . . . Low, wide step . . . Easy entrance and exit—no body contortions getting in and out behind the wheel . . . Counterweight-type windows—no cranks to turn.

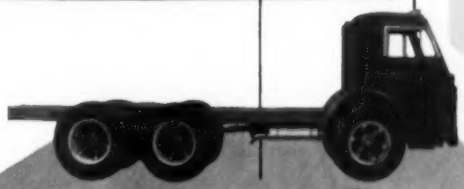
LOW MAINTENANCE COSTS

No complicated controls or unproved assemblies . . . For easy, quick servicing of engine and front of chassis, cab is raised vertically by hydraulic hand pump or by optional electric-hydraulic motor . . . Much less shop area required for servicing than for tilt-type C.O.E.'s—saves more than 20 square feet.



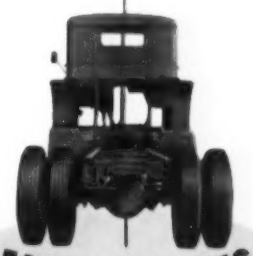
COMPLETE ACCESSIBILITY

No other type of C.O.E. affords such complete accessibility as Mack Cab-Forward design with its revolutionary Verti-Lift cab . . . Full exposure of engine, front of chassis and all accessories is easily and quickly achieved by raising the cab vertically . . . No disconnections of any kind . . . Cab is safely locked in raised position.



ADAPTABILITY

Four-wheel or six-wheel—platform or tractor type—Mack Cab-Forward "D" models are ideally suited for a wide range of services—city or rural delivery, over-the-road hauling, or construction fields. Mack makes more of its components than any other manufacturer. Therefore Mack is better able to produce vehicles of balanced design and controlled quality, perfectly adapted to meet specific job requirements.



EASY SERVICING

Usual every-day servicing is accomplished without raising cab . . . Engine is clean—requires no time-consuming, complicated service work on cluttered accessories . . . With cab locked in raised position mechanic can reach the complete engine from one position with no lost motion.

RELIABILITY AND ECONOMY

The same dependable components, performance-proved in other Macks . . . Chassis and gearshift are conventional—no intricate levers and shifting mechanism . . . No surge tanks or complicated fan drives for cooling. Mack Cab-Forward "D" models are typically Mack in every respect—the quality truck providing unmatched operating economy.

CLEAN STYLING . . . PROVED ENGINEERING

Never before such complete accessibility in C.O.E. design. New Mack Verti-Lift cab provides full exposure of all engine and front chassis parts. It's like working at a bench with headroom and sideroom to spare.

You get both in Mack Cab-Forward "D" Series. They're truly modern—with eye-catching distinction. That's the first thing you notice about these sensational new units.

But—take a deep-down look at what's underneath. You'll find broad shoulders there—the rugged construction that for more than half a century has been the hallmark of hard-working Mack trucks.

You'll see smart engineering throughout.

The revolutionary new Verti-Lift "raise-type" cab—up and locked in seconds—exposing all engine and front chassis parts for quick and easy servicing.

Compact design—to give you shortest overall length or extra bulk capacity.

Picture-window cab that really puts the driver in the "driver's seat"—a C.O.E. cab that permits a driver to get in and out without contortions.

And—of great importance to you as an owner—in terms of low maintenance and low operating costs, there's nothing complicated about these great new trucks. No intricate levers or shifting mechanism—no troublesome surge tanks for cooling . . . A conventional chassis throughout . . . And an engine that's entirely free of cluttered accessories.

Yes—any way you look at them—and it will pay you to take a good look—you'll see trucks that mark a new concept in C.O.E. design—trucks that are the ultimate both in styling and in engineering. See them at your Mack branch or distributor.

MACK TRUCKS

EMPIRE STATE BUILDING, NEW YORK 1, N.Y.

IN CANADA: MACK TRUCKS OF CANADA, LTD. MONTREAL, TORONTO

Fish Packers need '999'

So do makers and processors of beer . . . canned foods . . . cereals . . . malted milk . . . margarine . . . meats . . . mayonnaise . . . olives . . . sauerkraut . . . seasonings . . .

Morton '999' Salt
for better flavor and quality

Morton '999' Salt insures uniform flavor and quality in processed foods for two reasons:

1. Morton '999' is *guaranteed* always to contain more than 99.9% pure sodium chloride. The remaining 0.1% (or less) is a neutral inert sodium salt—and never bitter calcium or magnesium compounds.

2. Morton '999' Salt is produced by vacuum pan evaporation to assure you a salt that is clean, free-flowing... evenly soluble. The absence of magnesium compounds in '999' assures that there is no salt contribution to struvite formation.

For more information about Morton '999' Salt—and about Morton service and technical help—write this week to:

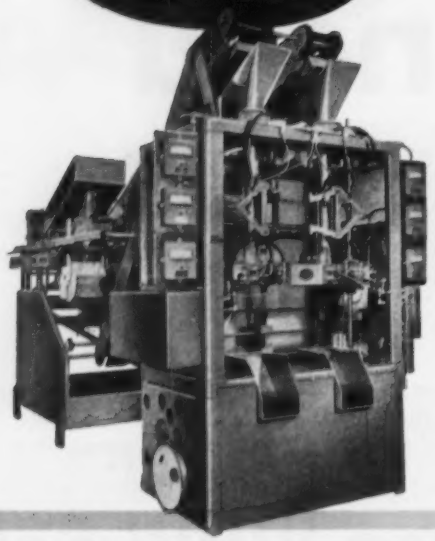
MORTON SALT COMPANY

Industrial Division, Department E7-4
120 South La Salle Street, Chicago 3, Illinois

For more information, use coupon on last page.

WHERE PACKAGING IS A PROBLEM... PUT IT UP TO

MODEL C TRANSWRAP

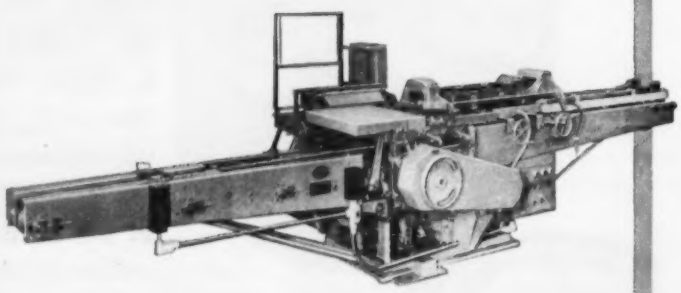


The completely automatic packaging machine! Model C "Transwrap by Package" represents the kind of engineering up-dating for which Package is famous! Far fewer parts than previous models for simple, efficient high-speed operation. Weighs and packs fine powders and granules, semi-liquids, liquids, and free-flowing solids in package sizes from 2" x 4" to 9 7-16" x 14". Auger, liquid, volumetric or net weight scale feed as required.

Automatically packs in printed or plain heat-sealing materials such as cellophane, coated papers, reinforced aluminum foil, pliofilm, vinyl, Saran, polyethylene. Unique resistance-type sealing for greater packaging speed and heat-control accuracy. Model shown is designed for low head-room installations. *See it at the show!*

FROZEN FOOD WRAPPER
MODEL FF-H

Guaranteed to wrap at least 160 standard sized cartons of loose frozen foods a minute with one operator! The "standard of comparison" throughout the frozen food industry for high efficiency and proven performance! Time and money-saving features include automatic feeder; automatic paper trip which stops paper when no package is fed; accurate electric eye registration; counter-balanced "lift-up" transport assembly for easy cleaning and adjustment. *See it at the show!*



STANDARD OF THE INDUSTRY

You want the best possible package for your products at the lowest possible cost. Helping all kinds of industries achieve that goal is our specialty. That's why you can always look to Package for all that's new and better in packaging machines.

Make sure you get equipment fitted to the specific needs of your business. Make sure of the cost-cutting performance you must have to reach and hold a high level of profit. Let the nearest Package representative know your packaging problem.

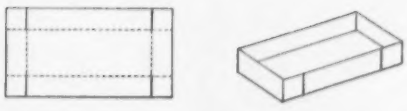
For more information, use coupon on last page.

PACKAGE

This completely new semi-automatic wrapping machine for meats on trays or cards gives the tightest, heat-sealed cellophane wrap of any mechanical wrapper on the market! It occupies the least floor space; it is the "cleanest" in design; it changes sizes in seconds—*with no change-over parts!* Meat can be cut, wrapped and sold the same day with full "bloom" and sales appeal. Speed range from 12 to 25 packages a minute. Maximum tray sizes: 5" H x 9½" W x 12½" L. Minimum: ¼" H x 3½" W x 4" L. *See it at the show!*

NEW!
HAND-O-MATIC

NEW!
TL 100
CARTON FORMER



The most advanced method of gluing a carton yet developed! Uses a rope-type thermoplastic adhesive which is automatically metered, melted and applied without fuss or muss. Requires only 3' x 3' of floor space, but can produce up to 100 smooth-interior trays or hinge-covered cartons a minute. Only the simplest, most inexpensive die-cut blanks required. Can handle most any stock, including polyethylene coated board. Maximum carton size range: 14" W x 4" D x 16" L. Minimum: 1⅞" W x ⅛" D x 3" L. Depth decreases according to width increase. *See it at the show!*

SEE THESE MACHINES IN ACTION

Visit Booth Nos. 1105 and 1111 at the **NATIONAL PACKAGING EXPOSITION**
April 18-21 — Chicago

PACKAGE
MACHINERY COMPANY

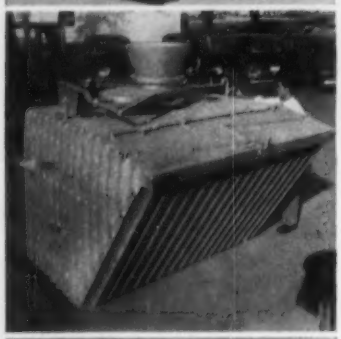
EAST LONGMEADOW, MASSACHUSETTS

NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND • CHICAGO • MINNEAPOLIS • ATLANTA
DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO

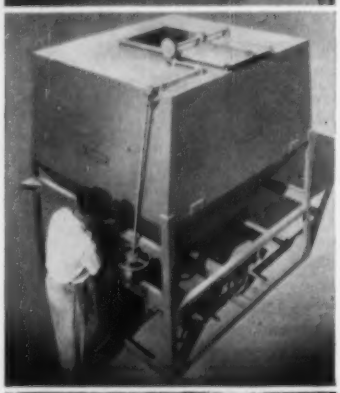
For more information, use coupon on last page.

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.



This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counter-balanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.



Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.

Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc.

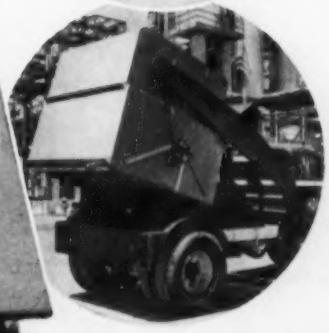
Above container is built with cast iron liner. The holes in outer wall are for cooling.

Here is one of several special drop bottom type containers equipped with couplers and ball bearing trucks for operation in train on rails.

THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS

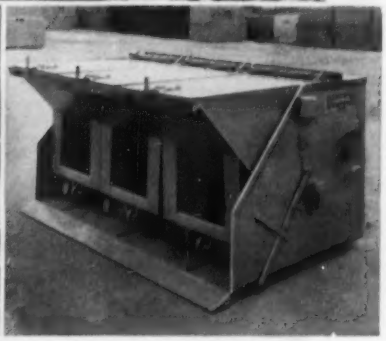
so many plants find the indispensable...



Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.

This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.

Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.

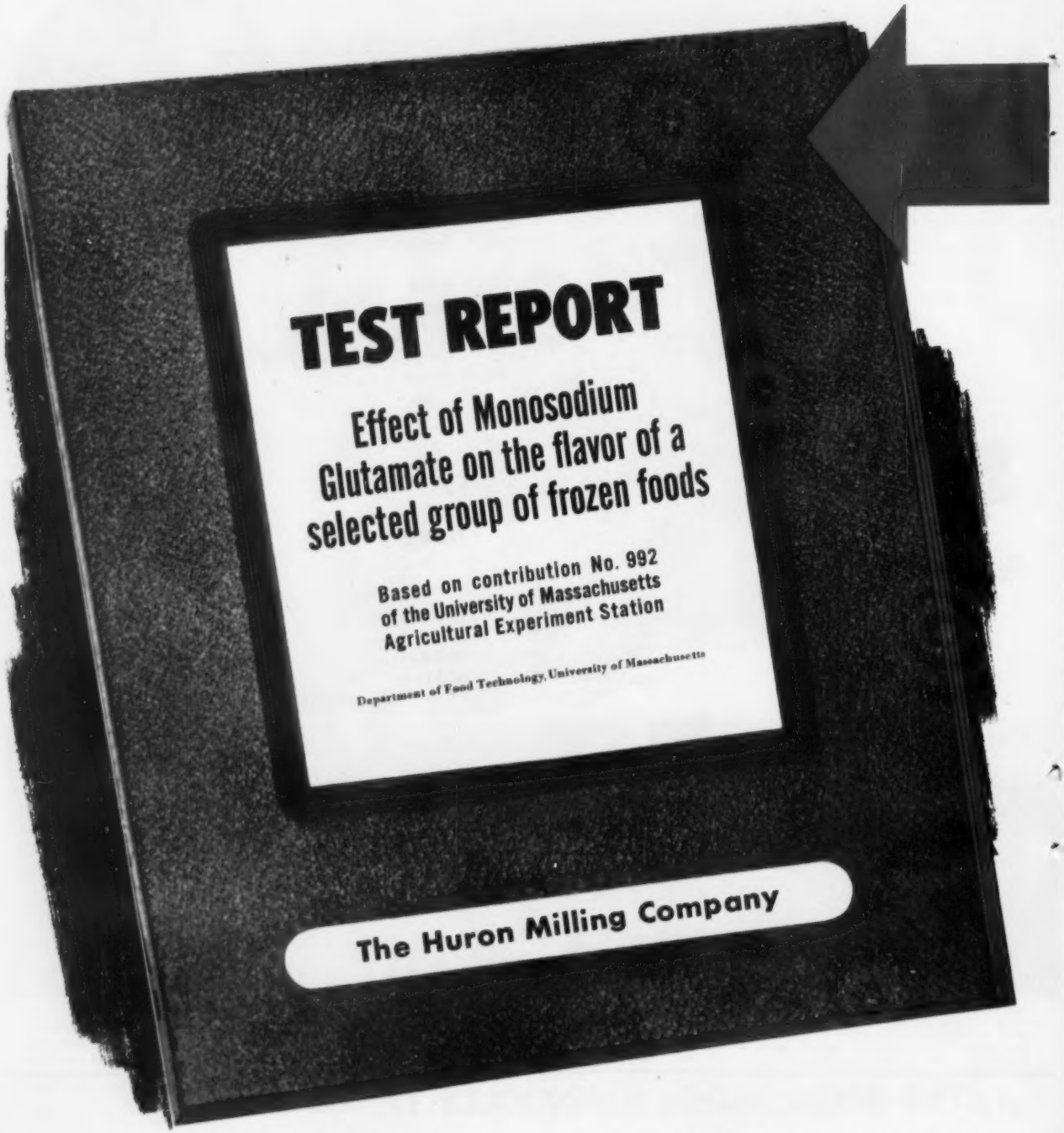


This is a master container with three 2 cu. yd. insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

745 SHEA BLDG., KNOXVILLE 17, TENNESSEE

HERE'S PROOF...

Huron MSG makes frozen


TEST REPORT
Effect of Monosodium Glutamate on the flavor of a selected group of frozen foods
Based on contribution No. 992 of the University of Massachusetts Agricultural Experiment Station
Department of Food Technology, University of Massachusetts
The Huron Milling Company

straight from the lab...

food taste better...longer

"...by adding MSG, flavor can be improved ...improvement apparent after year of storage"

DEPARTMENT OF FOOD TECHNOLOGY
University of Massachusetts

Two points—just revealed by new scientific 12-month flavor test reports at the University of Massachusetts make Huron MSG a must for your brand of frozen food!

Two-to-one consumer preference for MSG-treated frozen foods—in over half the taste tests—was definitely established for frozen seafoods and many frozen prepared foods.

After a 12-month storage period, the improvement in flavor of MSG-treated frozen foods was still apparent. Tests also determined most effective use-levels of MSG for each frozen food tested. B.4.17

Huron MSG's proven ability to keep frozen foods tastier, longer also saves you money

The cost of insuring consumer preference on your brand with Huron MSG—at the use-levels determined by these test reports—runs only ⅛ to less than ½ cent per lb.

But because Huron MSG lets you store your frozen foods up to a year and still maintain improved flavor, you can actually *save* money:

SPOT WAREHOUSING

If fear that your product may lose its flavor has kept you from spot warehousing for a chain, Huron MSG opens up this road to volume sales.

SELL OR HOLD

Huron MSG's ability to maintain "pack-day" flavor lets you sell your products when the market is right—hold them when the price of an item is temporarily depressed by over-supply.

PEAKS AND VALLEYS

Production schedules are often snarled by an over-sized finished pack inventory. Huron MSG lets you greatly increase maximum inventory limits, eliminate costly stop-and-go production.

Write us for reprints of these important test reports today.
The Huron Milling Co., 9 Park Place, New York 7, N. Y.

Huron **MSG**

PURE MONOSODIUM GLUTAMATE 99+%

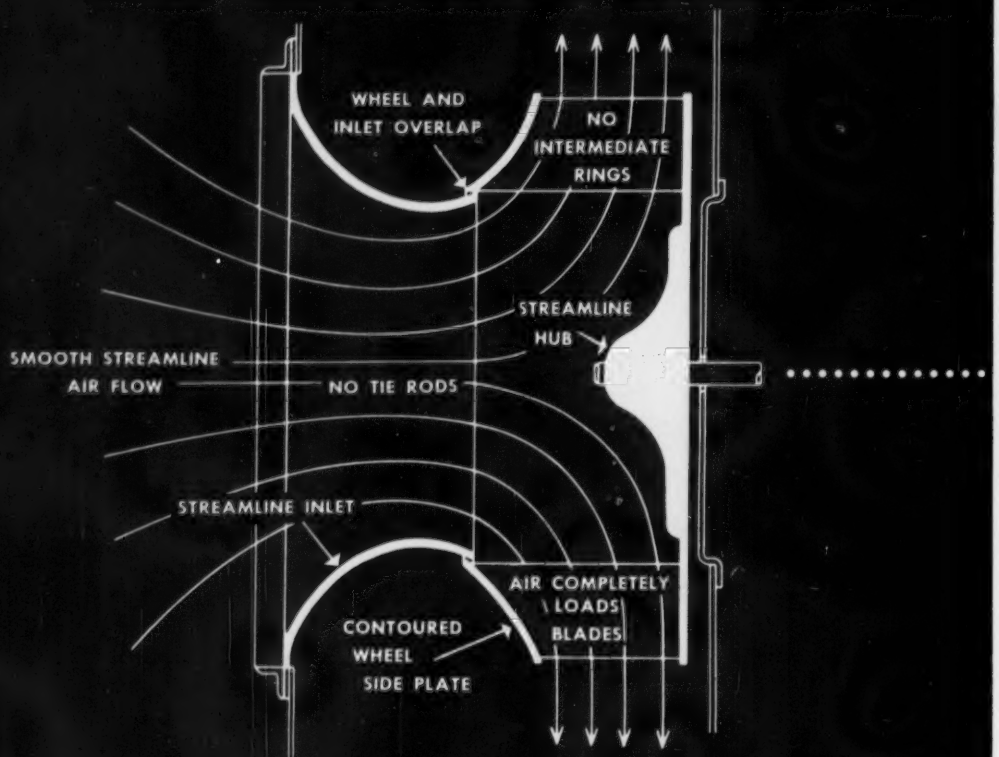
Made by the American pioneers in protein derivatives

FACTORIES: Harbor Beach, Michigan
SALES OFFICES: 161 E. Grand Avenue, Chicago 11 • 607 Second National Building, Cincinnati 2 • 383 Brannan Street, San Francisco 7

For more information, use coupon on last page.

Fact:

Westinghouse Aerodynamic Fan Line More Efficient,



MECHANICAL EFFICIENCY 86%...
STATIC EFFICIENCY OVER 80%

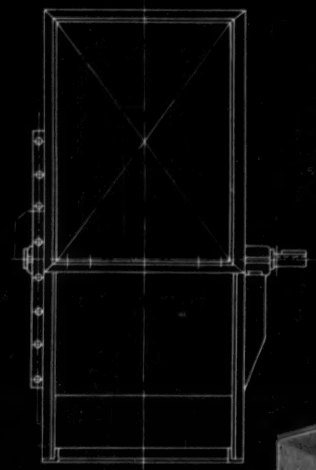
With unobstructed airflow through the wheel in all sizes, the "Silentvane" fan line also offers these other practical advantages:

1. **True self-limiting horsepower characteristic**
2. **Peak horsepower developed in normal selection range**
3. **Quiet, stable operation**
4. **Sharply rising pressure characteristic throughout normal performance range**

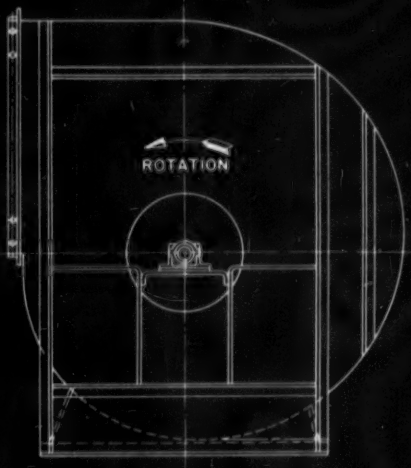
WIDE RANGE OF APPLICATION

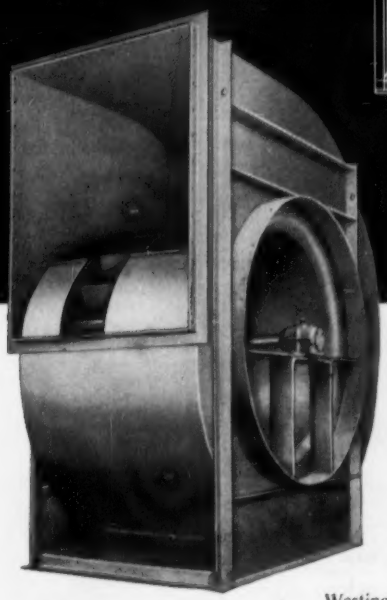
Handling from 600 to 500,000 cfm, the performance-proved Westinghouse "Silentvane" fan line provides an almost unlimited choice of air moving equipment. Coupled with Westinghouse-Sturtevant power-saving Vane Control, "Silentvane" fans offer precise control of air volume at optimum efficiencies. In smaller sizes, 36" and under, fan arrangements are convertible.

Research Makes "Silentvane" Quiet, Non-Overloading



Rugged housing construction and angle iron bracing prevents vibration . . . means quieter operation.





AIRFOIL BLADING AVAILABLE

. . . where quiet operation and power evaluation are prime considerations—
65% less noise intensity . . .
92% mechanical efficiency.

MORE FACTS?

Call your nearest Westinghouse-Sturtevant Sales Engineer . . . he's the "Man with the Facts" on heating, air handling, and electronic air cleaning . . . or fill in the coupon below.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE . . . IF IT'S

J-80437

Westinghouse

Westinghouse Electric Corp.
Sturtevant Division, Dept. 17C
Hyde Park, Boston 6, Mass.

I'm interested in your new booklet. Send me a copy right away.

NAME AND TITLE.....

COMPANY.....

CITY.....STATE.....

For more information, use coupon on last page.

Here's Material Handling..

..WITHOUT WOODEN PALLETS!

Clark's

Pul-Pac System

. . . cuts labor and pallet costs $39,000

HERE'S MONEY-SAVING NEWS—The fiberboard "sheets" that replaced wooden pallets at Narragansett Brewing Co. have brought tremendous savings in storage space, labor, and pallet costs. The new "pallets" cost less, are easier to maintain, save space.

KEY TO SUCCESS is Clark's exclusive Pul-Pac attachment. Operation is simple—the Pul-Pac grasps the leading edge of the fiberboard pallet—pulls the load on to the truck's forks. To unload, the Pul-Pac pushes against the load, and the material slides into a stored position.

SAVINGS REPORTED by Narragansett:

- Labor time cut to 20 man-hours per freight car—a saving of $20,000 per year.
- Pallet investment cut from $21,000 (wooden pallets at $7) to a low $1800 (fiberboard pallets at 60c)—a saving of $19,200
- Other savings: increased storage space, reduced damage to supplies, lower pallet maintenance cost.

CLARK'S PUL-PAC is typical of the *complete line* of attachments designed to make your Clark equipment more versatile, much more profitable. You can get complete details on the Pul-Pac and other Clark attachments by calling your local Clark dealer. He's listed in the Yellow Pages under "Trucks, Industrial." No obligation . . . so why not call today.

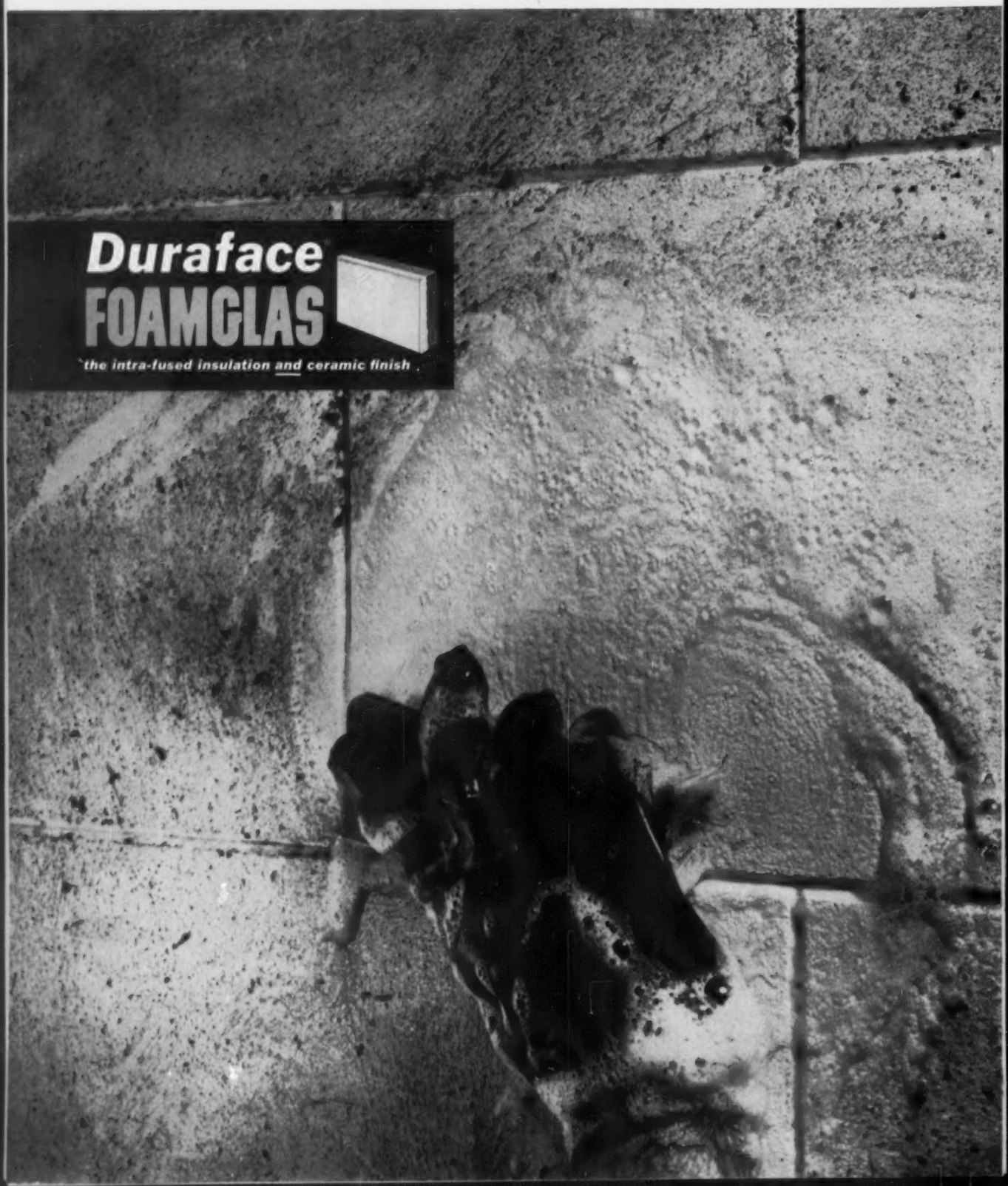
Without wooden pallets, Clark's Pul-Pac lifts load to edge of trailer—slides the load into compact storage. No wasted space with this system.

CLARK® EQUIPMENT

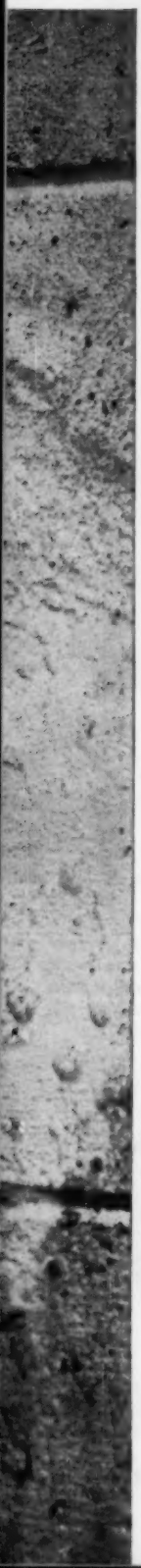
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

For more information, use coupon on last page.

New product combines finish in waterproof,



insulation and durable block



Tough ceramic finish and cellular glass insulation are fused together

Now you can make your insulated walls entirely of glass including the finish on the insulation. You can do it by using a single new product . . . *Duraface* FOAMGLAS. That's Pittsburgh Corning's unique cellular glass insulation intra-fused with a white crust of denser, sealed glass cells.

You can scrub it or hose it down. It's waterproof.

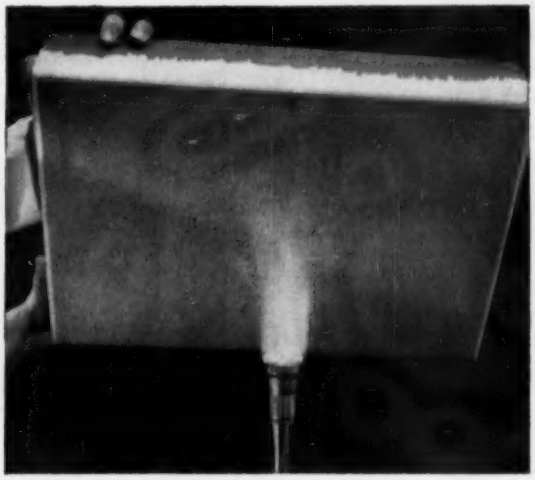
You don't have to worry about fire or vermin. It's completely inorganic.

You can avoid trouble with cracking or bulging of plaster finishes. *Duraface* FOAMGLAS has an integral finish that can't peel or separate. It'll take greater impacts than ordinary finishes.

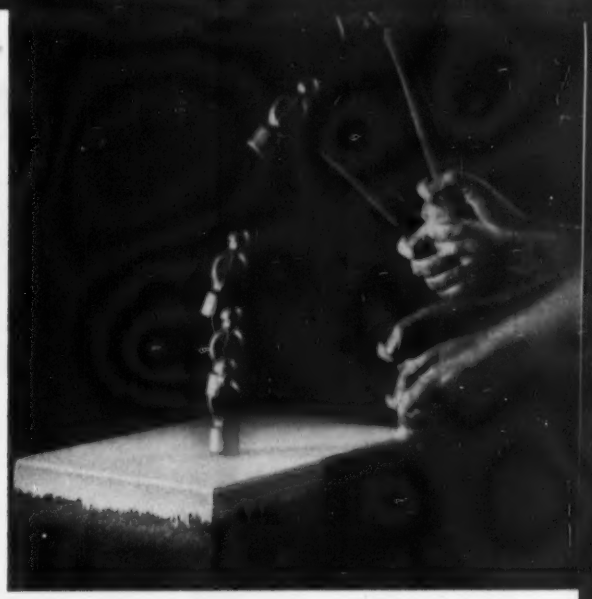
This remarkable new product may solve *your* insulating and finish problems! Wouldn't you like to see a sample and get descriptive folder? Please use coupon today.

* "Duraface FOAMGLAS" is a trademark of Pittsburgh Corning Corporation.

Pittsburgh Corning Corporation
Dept. O-45, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor Street West, Toronto, Ontario



FIREPROOF BLOCKS of *Duraface* FOAMGLAS help protect your plant. They can not burn or transmit fire.



EASY MAINTENANCE is built right in *Duraface* FOAMGLAS. It'll withstand greater impacts than cement plaster finishes. Its integral finish can't blister or peel.

SANITARY WALLS are assured because *Duraface* FOAMGLAS is vermin-proof and moisture-proof. When you wash down the insulation, it stays dry and efficient.

Pittsburgh Corning Corporation
Dept. O-45, One Gateway Center
Pittsburgh 22, Pa.
(In Canada: 57 Bloor St. W., Toronto, Ontario)

☐ Please send me a free sample of *Duraface* FOAMGLAS and your new folder with detailed information.

☐ Send engineer to discuss its use.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

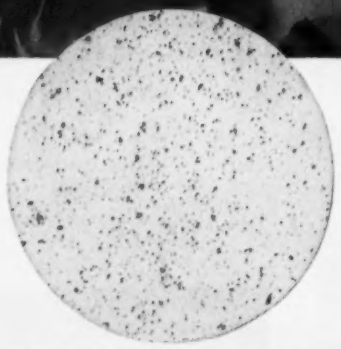
In the laboratory of Wm. J. Stange Co., a food technologist compares 50-A micro-ground Spice with ordinary ground spice under a microscope.

NEW MICRO-GROUND SPICES

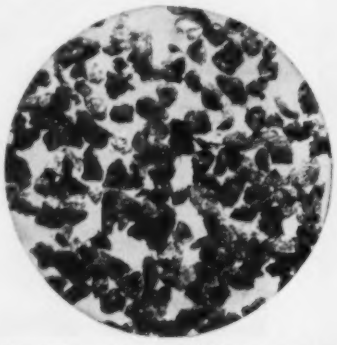
Although spices themselves haven't changed in a thousand years, unsuspected qualities have been discovered in them by a recently developed process called micro-grinding. Patented by Wm. J. Stange Co., this process consists of feeding whole natural spices into specially designed water-cooled roller mills which pulverize the spice into particles so minute, that only thru a microscope can you appreciate their size. Compared to ordinary grinding methods, the new process produces 50 to 100 times more particles of spice . . . millions more per pound.

The minute size and vast number of spice particles permit uniform and thorough distribution throughout each batch of food product, eliminating specking or the formation of hot spots.

Most important, however, is the standardization of flavor made possible by this unique process. This, in addition to the total utilization of flavor from the spices themselves makes this new spice one of the really important developments in the food processing industry.



MICRO-GROUND Black Pepper spice particles (here magnified 30 times) are practically invisible to the naked eye.



ORDINARY ground (50 mesh) black pepper particles (also magnified 30 times) appears as huge boulders by comparison with micro-ground spice.

STANGE

Announces New

50-A®

spices

Natural Whole Spice Ground to Microscopic Fineness!

Only 50-A micro-ground spices . . . originated by Stange . . . give you the true flavor of ground spices PLUS controlled uniformity, together with the following completely new characteristics—

- **All the flavor and color of natural spice without the specks**
- **More uniform distribution**
- **Maximum availability of flavor**
- **Constant control of flavor intensity**
- **Maximum retention of flavor**
- **Constant spice levels during shelf life**
- **Easy to use, powder form. Available in 50 to 250 pound bulk containers, or in exact-weight, batch size packages.**
- **Available in individual spices or complete seasoning blends**

For complete details on applying new Micro-Ground 50-A Spices to your fine foods, write, wire or phone—

Wm. J. Stange

"SILENT PARTNERS IN FAMOUS FOODS"®

Chicago 12, Illinois Oakland 21, Calif.

Stange-Pemberton Ltd., New Toronto, Ontario

View of battery of special roller mill equipment processing natural spice into 50-A Micro-ground Spice. The large steel rollers, between which the spice is ground, are perfectly smooth and turn at differential speeds to cause a shearing action between the smooth surfaces. Rollers are water-cooled internally to maintain the spice at a low temperature and to prevent loss of volatile flavors.

MICRO-GROUND SPICE..... .....ORIGINATED BY STANGE

Wm. J. Stange Co. who last year celebrated its 50th anniversary, spent more than two years perfecting the micro-grinding process. Sold under the copyrighted name of 50-A Spice, these new seasonings are fully protected by patents and supplied to the food industry by Stange exclusively.

Not only are individual spices: pepper, nutmeg, cinnamon, etc. available in micro-ground form but in combination with soluble C.O.S. (Cream of Spice) Seasonings. These special blends are called Micro-Cream. By combining the two types of spices, 50-A and C.O.S., Stange can now produce seasoning blends utilizing the special advantages of each to achieve the most satisfactory flavor, color and solubility in the finished product. Micro-Cream spice blends, too, are flavor controlled to insure uniformity.

STANGE'S EXPERIMENTAL KITCHENS, laboratories and technical staff are available to develop special seasoning blends, or assist you in creation of new products.

For more information, use coupon on last page.

Average consumers reduced their trips to the super market by 40% in the last 20 years

GEAR YOUR PACKAGING METHODS

to these CHANGING MARKETING HABITS

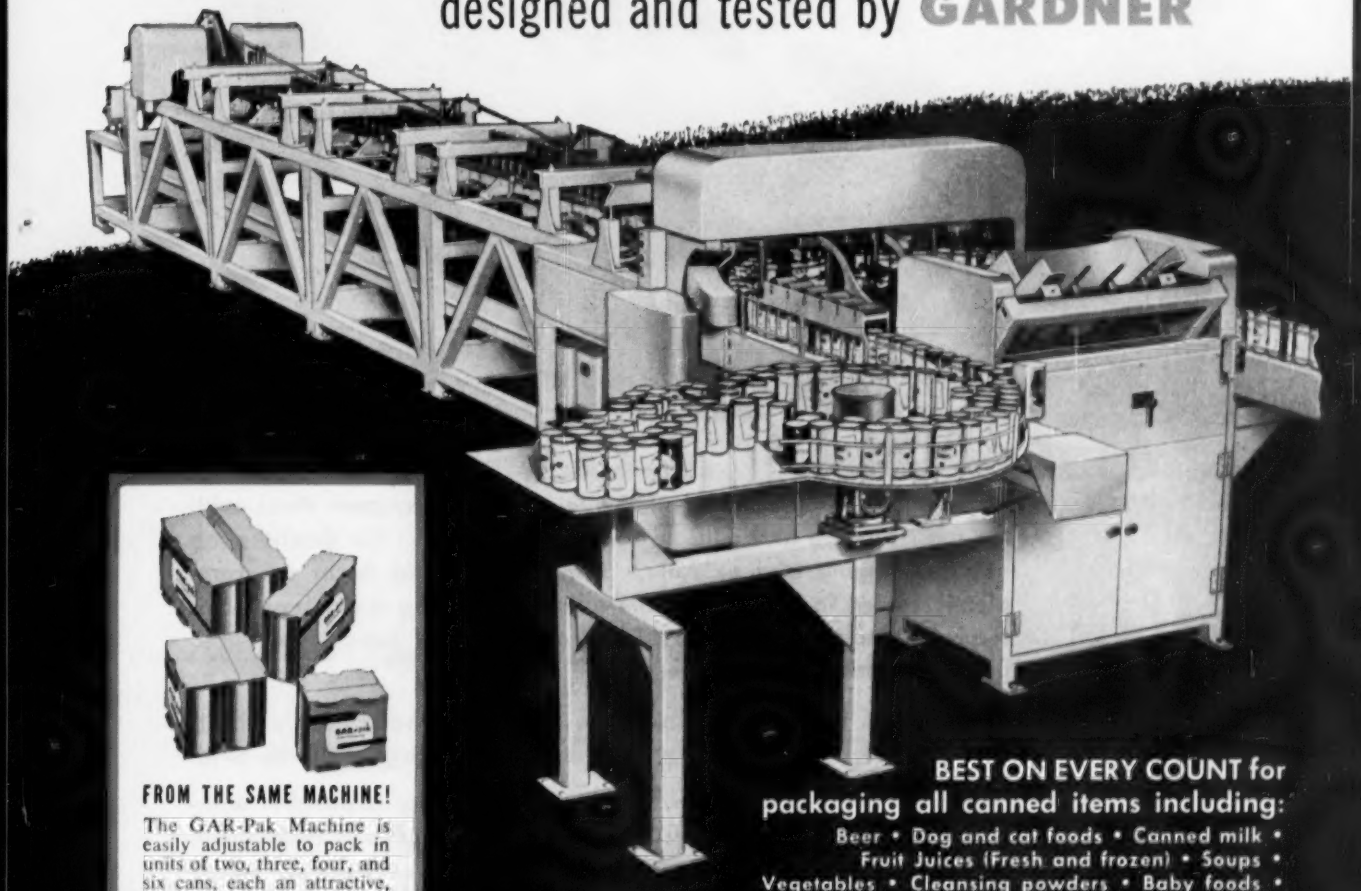
with this GAR-pak* MULTIPLE CAN PACKAGING MACHINE

* Trade Mark

Follow the Volume-Trend to MULTIPLE CAN PACKAGING

with this simple, flexible, money-saving machine...

designed and tested by GARDNER



FROM THE SAME MACHINE!

The GAR-Pak Machine is easily adjustable to pack in units of two, three, four, and six cans, each an attractive, secure and convenient carrier, with or without a handle.

BEST ON EVERY COUNT for packaging all canned items including:

Beer • Dog and cat foods • Canned milk • Fruit Juices (Fresh and frozen) • Soups • Vegetables • Cleansing powders • Baby foods •

Developed and fully tested in our own plant, the GAR-Pak is now ready to simplify–at low cost–the multiple-unit packing of your canned items. Average operating speed, 500 cans per minute (83 six-can paks), easily adjustable to various can dimensions, all parts fully visible to the operator. Many other exclusive features – all designed to help you increase your share of the growing market for multiple can packaged items. WRITE! Further information will be sent at once.

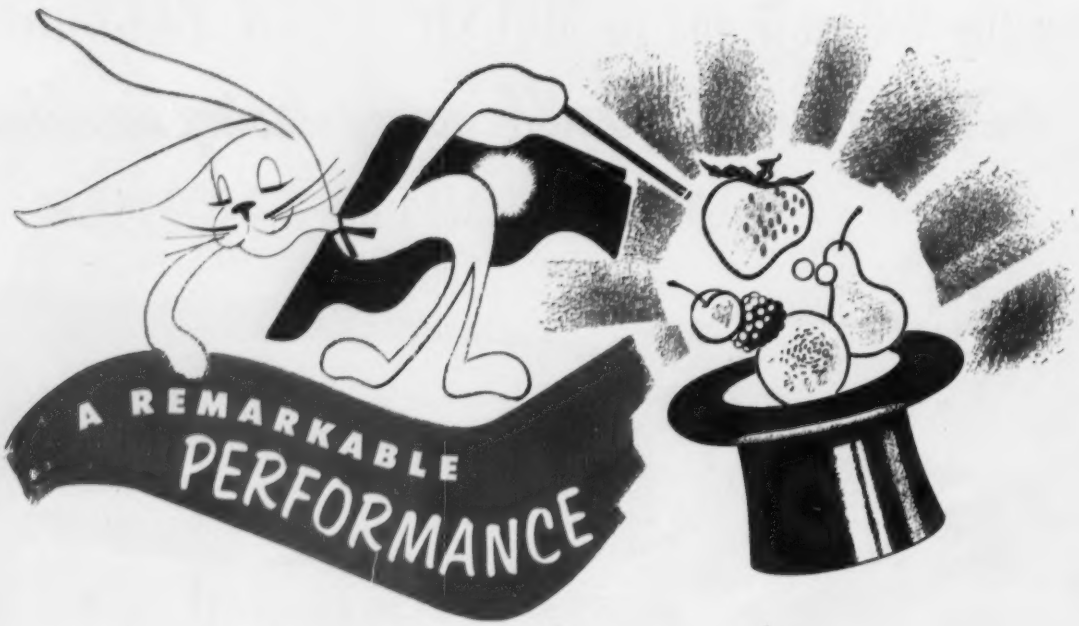
MORE FACTS ABOUT THE GAR-PAK MACHINE at the National Packaging Exposition, Booths 126, 128, 130, 132, 227, 229, 231 and 233.

Many of America's greatest products go to market in "Cartons by Gardner"

GENERAL OFFICES: Middletown, Ohio—PLANTS: Middletown, Ohio; Lockland *(Cincinnati)*, Ohio
SALES OFFICES in Chicago, Cleveland, New York, Philadelphia, Pittsburgh, St. Louis, Greensboro, N. C.

THE GARDNER BOARD AND CARTON CO.

Manufacturers of Folding Cartons and Boxboards



★ **The SEALVA process hermetically seals flavors, even those with the most fugitive and delicate components, against the deteriorating effects of aging and oxidation. Droplets of liquid flavor are completely sealed in an inert, edible gum film forming a dry powder of controlled particle size. The completely protected flavor is released only in the mouth or in water.**

SEALVA flavors, introduced 2½ years ago, have been enthusiastically accepted in almost every branch of the flavored goods field.

In GELATIN DESSERTS, far superior flavor quality is possible without regard to aging. In CONFECTIONS of the pressed type, flavor permanence is assured. In MIXES and DESSERTS, problems of oxidation and terpenization no longer exist. As DAIRY MIXES, SEALVA flavors offer unbelievable possibilities. In PHARMACEUTICALS SEALVA flavors find their widest acceptance.

Wherever permanent flavor perfection is desired in dry form, SEALVA is the answer.

Tell us your product, your problem. Send for samples and literature.

VAN AMERINGEN-HAEBLER, INC.
521 West 57th Street, New York 19, N. Y.

★ Alva FLAVORS

ADVANCES IN PACKAGING which made efficient self-service stores possible have posed question of possible contamination of foods by chemical components of packaging materials and containers.

Evaluating Safety of Chemicals In Packaging Materials

While no imminent hazard is seen, FDA is concerned. So it has become pertinent to consider possible effects of chemicals on flavor, nutritive quality, and chance of injury from unintentional contamination of food

BERNARD L. OSER
Director, Food Research Laboratories, Inc., Long Island City, N. Y.

Many of the chemical components used in packaging materials are relatively new to such uses. Therefore it has become pertinent to inquire not only as to the effect of the container or wrapper on the flavor and nutritive quality of the food, but as to the possibility of injury resulting from unintentional contamination.

It must be emphasized that, so far as is known, no incidents have occurred to suggest a need for concern over the hazardous nature of any of the newer chemicals as used in packaging materials.

To cite an actual case where a potentially injurious chemical contaminant was introduced into a food via the package, government officials have had to dig up the old practice of shipping tea in lead-foil containers.

So the problem is not one of real or imminent danger but rather of conformity to provisions of the

What's Behind It All

Long shelf life for packaged foods, often under adverse conditions, introduces problems of stabilization against the ravages of heat, light, oxygen, humidity, and pests.

The containers themselves present problems of flexibility or rigidity, light or vapor transmission, tear resistance, protection against insects or rodents, and so forth.

Materials from which food packages are fabricated fall into seven major catagories: Wood, paper, fabric, glass, metal, rubber, and plastics.

Adjuncts to these include: Lacquers or enamels for lining cans.

Waxes, resins, and other coating substances for containers or closures.

Antimycotics and pesticides used in paper, wood, or cloth containers.

Solders, adhesives, sizings, finishes, pigments, and printing inks.

A variety of special purpose chemicals used in paper and polymeric films, such as plasticizers, moisture- and grease-proofing agents, wet strength agents, release agents, etc.

Packaging often involves long and intimate contact between the food and the container.—*B.L.O.*

federal law aimed at keeping foods free from poisonous or deleterious substances.

The Points Of Law

According to Section 402(a) of the Food, Drug & Cosmetic Act, a food is deemed adulterated if its container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health.

Note that this particular section does not necessarily exclude the use of a poisonous or deleterious substance as a packing component. Only if it may render the food harmful would the presence of such a substance in a packaging material be violative of this provision.

However, Section 406(a) prohibits addition to any food of any poisonous or deleterious substance, regardless of whether or not the food may be rendered harmful.

Exceptions may be made in cases where such substances are required in production or are unavoidable by good manufacturing practice. In such cases, regulations establishing tolerance limits are promulgated on the basis of evidence taken at public hearings. Technological limitations, rather than the maximum safe levels, determine the tolerance limits. But the latter must, of course, be such as to protect the public health.

It follows from Section 406(a) that:

1. Toxicological evidence is required to ascertain whether or not a substance is in fact poisonous or deleterious. And if so, in what manner and degree, since such data are needed in the event a tolerance is to be established.

2. Analytical evidence is needed to establish whether or not the substance is actually present in the food and in what amount.

3. Technological evidence is needed to prove the necessity or unavoidability of the amounts so added.

The law permits the administrator wide latitude in the interpretation of the toxicological data, since poisonous or deleterious substances are not specifically defined but are administratively categorized independently of the amounts which may be ultimately consumed in foods.

In the minds of many toxicologists, the apparent legal necessity to determine whether a substance is a poison —irrespective of the quantity, frequency, or manner of administration— is somewhat incongruous. It fails to take into consideration, for example, the well-known fact that pharmacological reactions, like most biological phenomena, follow a sigmoidal course. That is to say, whereby no

Acceptability Ratings, by FDA, of Chemical Components of Packaging Materials

NOTE—This table is derived from data contained in text references 2 and 4, publications of the Division of Pharmacology of the Food & Drug Administration.

It is offered only for guidance. Questions relating to specific compounds and their use should be referred to the FDA. Changes are being made constantly in the list of compounds.

It should be stressed that the acceptability of the compounds so listed may be based upon specific uses, some of which are indicated in the table footnotes.

Additional compounds which may have been considered acceptable for special food uses may not appear in this list because they have not been considered as components of packaging materials by FDA up to time of publication of the original papers referred to.

RESINS

Acceptable

Butadiene-acrylonitrile (perbunan or hycar synthetic rubber)
Cellulose acetate
Cellulose, regenerated
2-Chloro-butadiene, (polymer of[A])
Dimethyl terephthalate and ethylene glycol, (condensate of)
Melamine-formaldehyde polymer[A]
Methyl and ethyl acrylate
Polyethylene
Polystyrene
Polyvinyl acetate
Polyvinyl alcohol, resins from high and low viscosity[B]
Polyvinyl chloride
Polyvinyl chloride-acetate
Rubber hydrochloride
Silicone oil[A]
Urea-formaldehyde polymer[A]
Vinylidene chloride

Not Acceptable

Aniline formaldehyde
Cumarone-indene
Diethyl maleate with vinylite
Epichlorohydrin and bisphenol (polymers of)
Maleic anhydride
Maleic glyceride (copolymers of)
Phenol formaldehyde
Phenol formaldehyde resins
Polymeric furfuryl alcohol
Polyvinyl acetal
Polyvinyl butyral
Polyvinyl formal
Rosin, hydrogenated
Rosin, polymerized
Urea formaldehyde

PLASTICIZERS

Acceptable

Acetyl tributyl citrate
p-tertiary Butyl phenyl salicylate
Butyl phthalyl butyl glycollate
Butyl stearate
Dibutyl sebacate
Di-2-Ethylhexyl phthalate[C]
Di-iso-butyl adipate
3-(2-Xenoxyl)-1, 2-Epoxypropane
2-Ethylhexyl diphenyl phosphate
Ethyl phthalyl ethyl glycollate
Glycerol monooleate

Not Acceptable

Butyl acetyl ricinoleate
Butyl benzyl phthalate
Dibutyl phthalate
Dicapryl sebacate
Dicyclohexyl phthalate
Diectyl phosphate
Di-iso-octyl phthalate[D]
Dioctyl adipate
Dioctyl sebacate
Iso-octyl isodecyl phthalate
Methyl phthalyl ethyl glycollate
Polyester epoxide[D]
Polyisobutylene
Triacetin
Tricresyl phosphate
Triethyl citrate[D]
Tri-iso octyl phosphate
Trimethyl hexyl adipate
Tripropionin

STABILIZERS

Acceptable

Aluminum monostearate
Ammonium citrate
Ammonium potassium phosphate
Calcium acetate
Calcium carbonate
Calcium ethyl acetoacetate
Calcium glycerophosphate
Calcium oleate
Calcium ricinoleate
Calcium stearate
Copper, (salts of[E])
Disodium hydrogen phosphate
Magnesium glycerophosphate
Magnesium stearate
Manganese (salts of[E])
Mono- di-and tri-calcium phosphate
Mono- di- and tri-magnesium phosphate
Potassium citrate
Sodium citrate
Tin stearate
Zinc oxide[E]
Zinc stearate[E]

Not Acceptable

Aluminum ethyl caproate
Antimony compounds
Barium compounds
Boron compounds
Cadmium compounds
Chromium (salts of trivalent)
Chromium oxide
Lead compounds
Mercury compounds
Selenium compounds
Strontium laurate
Tin dibutyl dilaurate
Tin dibutyl laurate maleate

Table Continued

RELEASE AGENTS

Acceptable

Methyl polysiloxane
Oleic acid amide
Polyoxyethylene glycol 400
Polytetrafluoroethylene
Silicone oil (350 cs. viscosity)
Stearic acid amide

Not Acceptable

Polytrifluorochloroethylene[D]

ANTIOXIDANTS

Acceptable

Butylated hydroxy toluene (BHT)

Not Acceptable

Hydroquinone monobenzyl ether
Mono- and di-heptyl amine derivatives of diphenylamine
Para-phenyl phenol
Phenyl alpha-naphthylamine[F]
Phenyl beta-naphthylamine[F]

ACCELERATORS

Not Acceptable

Tetraethyl thiuramdisulfide
Tetraethyl thiuramdisulfide

COLORANTS

Acceptable

Carbon black
Certified colors only
Mineral pigments
Oxides of iron
Titanium dioxide

EMULSIFIERS

Not Acceptable

Decyl benzene sodium sulfonate
N-octa decyl disodium sulfosuccinamate[G]

ANTIMYCOTICS

Acceptable

Methyl and propyl parahydroxy benzoates
Sodium benzoate
Sodium and Calcium propionate
Sorbic acid

Not Acceptable

Captan
Ferbam

PROTECTANTS (INSECTS)

Acceptable

Pyrethrins in combination with piperonyl butoxide[H]

Not Acceptable

DDT[I]
Methoxychlor[I]

PROTECTANTS (RODENTS)

Not Acceptable

Polyethylene polysulfide
Quaternary ammonium compounds
Sodium fluosilicate
Zinc dimethyl dithiocarbamate (cyclohexylamine complex of)

ANTISTATICS

Acceptable

Zinc chloride

LUBRICANTS

Acceptable

Acrawax C
Aluminum oleates, stearates, and palmitates
Calcium oleates, stearates, and palmitates
Carnauba wax
Magnesium oleates, stearates, and palmitates
Paraffin
Sugar-cane wax
Zinc oleates, stearates, and palmitates

Not Acceptable

Barium (metallic soaps of)
Chromium (metallic soaps of)
Zirconium (metallic soaps of)

[A]For giving wet strength to paper.
[B]For fatty foods only.
[C]For foods of high water content only.
[D]Studies in progress.
[E]Contamination under 50 ppm.
[F]If film comes in direct contact with food.
[G]Except under conditions in which not any of surfactant remains in finished wrap.
[H]Restricted to one layer of multiwalled container.
[I]Requires evidence of no migration into foods.

reaction at all occurs until a minimum threshhold dose is reached. Beyond that, the reaction rate gradually increases to a maximum and then (if the organism survives) diminishes until it eventually plateaus.

Consequently, it does not follow that a substance which is toxic at a given dose or frequency of administration is also poison at any lower dose or frequency of administration. The sophistry of the concept that a poison can exist in a vacuum has been discussed by the writer elsewhere.[1]

Although the law requires FDA to proceed against foods containing poisonous or deleterious substances in violation of Section 406(a), such actions are extremely rare. So far as I am aware, no seizures based on adulteration with chemical components of packaging materials have ever been made.

However, the FDA has concerned itself in a very material way with this problem, owing largely to the voluntary cooperation of the chemical, packaging, and food industries. Scores of compounds have been presented for evaluation on an informal basis. And, as anyone who has had dealings with FDA will attest, its various divisions have been extremely cooperative in constructively reviewing proposed investigations or scientific data.

Recent publications from the Division of Pharmacology and the Division of Food[A, B] list more than 175 chemical ingredients of plastic food-packing materials. Roughly half of these are regarded as unsafe or unacceptable by reason of insufficient or no toxicological data. This list (see table) extends and supplements an earlier compilation of food packaging chemicals published in 1951.[4]

The criteria employed for establishing the acceptability of these substances have been discussed in several publications of the Food & Drug Administration.[5] A recent revision (Nov., 1954) of the statement of the National Research Council's Food Protection Committee, entitled *Principles and Procedures for Evaluating the Safety of Intentional Chemical Additives in Foods*, offers sound guidance in this direction.[6]

It is contended by certain individuals in the packing industry that chemical components of food packaging materials fall into a special category. They are neither unintentional additives like the pesticides which are used purposefully in production, but not intended to remain in food. Nor are they intentional additives in the sense that they are deliberately incorporated in the foods to serve a technological or nutritional function.

Regardless of the merits of this argument, the fact remains that, under our present law, foods containing added poisonous or deleterious substances, whether inadvertently or otherwise, come under Section 406(a) unless, of course, the substances in question are pesticide chemicals. In that case, the applicable law is the recent Miller amendment, incorporated into the Food, Drug & Cosmetic Act as Section 408.

Establishing Acceptability

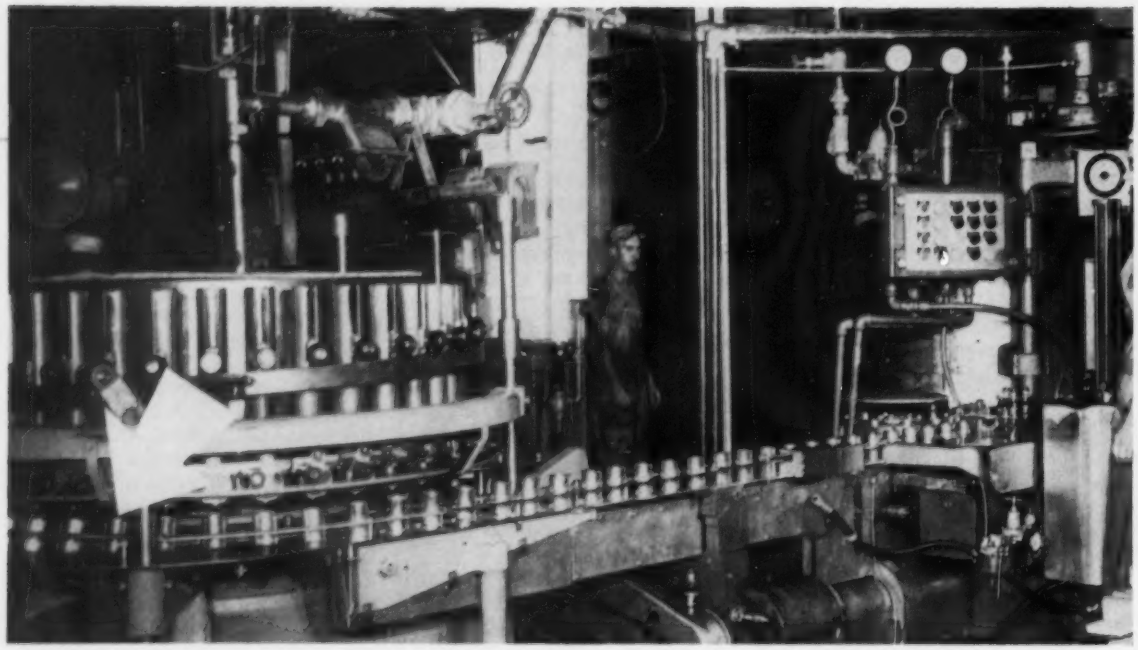
Appraisal of the acceptability of a chemical component of a food wrapper or container from the safety standpoint requires answers to two major questions:

1. Is it "poisonous or deleterious"?
2. Is it added to food?

If both questions are answered affirmatively, it is necessary under the law to establish necessity or unavoidability. If this can be done successfully, the technological, analytical, and toxicological data can then be evaluated as a basis for setting up a tolerance. In practice the first steps usually are analytical.

This requires the availability or the development of an analytical method of reasonable specificity and capable of detecting concentrations of the order of one part in 10,000,000

(*Turn to page 231*)



VELOCITY-PLUS is won with synchronization of 35-spout filler (left) and 10-spindle closer (right). Both are driven by hydraulic motor. Spillage is minimized by special can-track (arrow) that's banked around filler.

Record Speeds, Precise Fills On Small-Can Line

Compact machines at Heinz fill and close at 1,000/min . . . Sharp control avoids surging, splashing . . . Downtime, maintenance, labor held low

FE STAFF

Outstanding performance in filling and closing small cans has been established on the baby food line at the Leamington, Ontario, plant of H. J. Heinz of Canada, Ltd. Particularly hailed are these six benefits—

1. **New highs in closing speeds**
2. **More cases per minute per square foot of floor space**
3. **Less production losses due to downtime**
4. **Lowered maintenance costs**
5. **Reduced labor per unit of production, and**
6. **More dependable closing—fewer seam failures.**

Here, at the rate of 1,000 per minute, cans of baby food are taken directly from a 35-spout Pfaudler filler by a lug chain and transferred to the feed conveyor of a high speed 10-spindle closing machine. The filling machine is driven by a shaft from the closing machine and synchronized with it.

The precision required, at the high operating speeds of these machines, demands carefully controlled acceleration and deceleration. Drive of the units is a hydraulic motor mounted vertically on top of the closing machine. It is powered from a remote hydraulic unit, the latter driven by a 25 hp. electric motor (as detailed in FE Jan., p. 70).

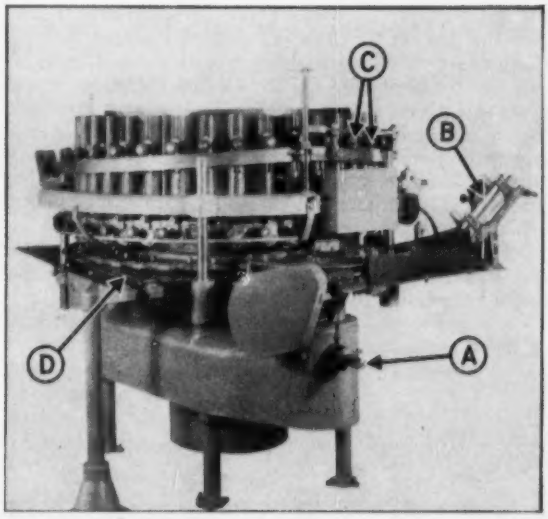
Rate of the dual units can be maintained exactly, as well as the speed of starting and stopping. A highly precise electric speedometer provides the means of checking for extreme accuracy.

With range of speed varying up to 1,000 cans per minute—and in some instances going as high as 1,200—the torque in the shaft connecting units will vary proportionately, shifting the timing of cans transferred from filler to closing machine.

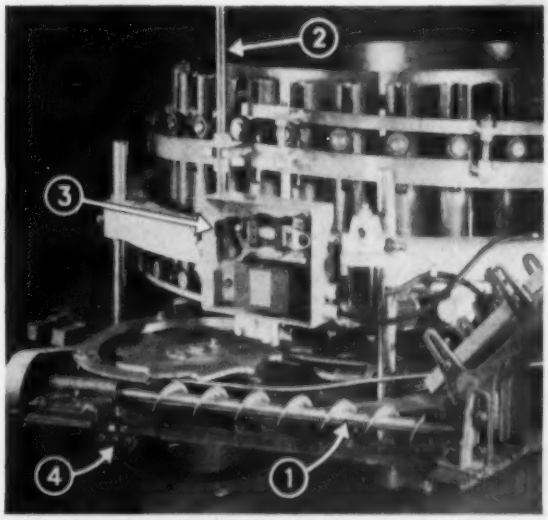
Regulated can spacing and feed is assured by a hand manipulated attachment—a special 360-deg. timing-in-motion device. This makes it possible to maintain velocity-and-torque compensation at all times.

Filler-Closer Coordination

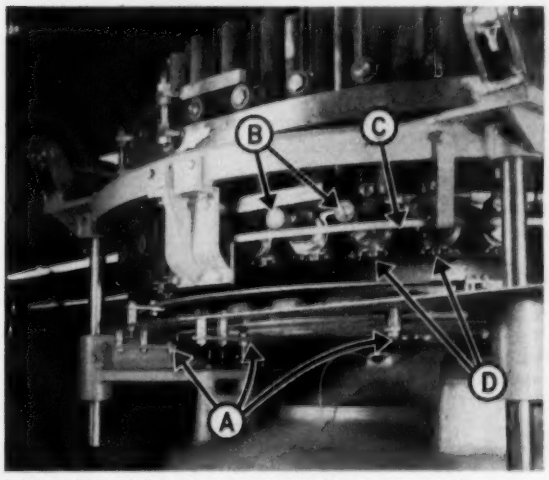
Actually, mechanics of the 35-spout filler are simple—so simple, in fact, that they serve to assure long machine life with minimum time for clean-up and maintenance. The product to be filled is fed into a rotating bowl. And mounted around this bowl, and rotating with it, are filling stations, each having a cylinder, piston, and valve.



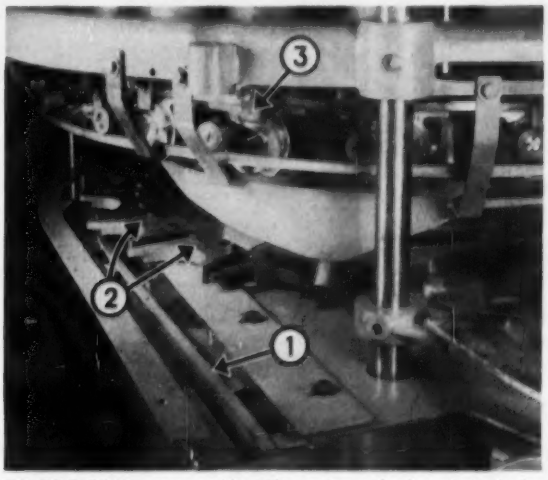
FILLER closeup. Unit is driven by shaft (A), powered by closing machine's hydraulic motor. Cans, fed by chute (B), are filled as piston rollers (C) are lowered, are then discharged onto straightline conveyor (D).



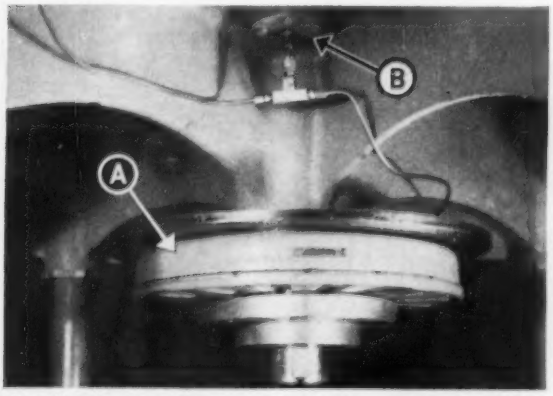
SCREW CONVEYOR FEED (1) positions containers in starwheel. Amount of fill is regulated by adjustment screw (2). Pneumatic control (3) is no-can no-fill mechanism. All lubricants go to three points at one station (4).



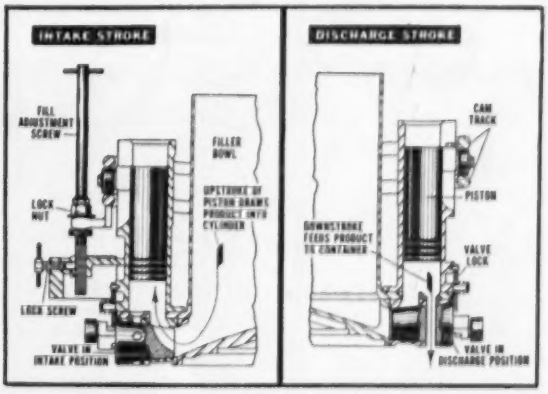
CAN RAIL GUIDE (A) is adjustable to vary tilt of containers. Cam rollers (B), riding on cam track (C), control both intake and discharge operations of filling chamber. Product goes to containers through nozzles (D).



TILTED-RAIL can guide (1) raises during travel in straightline conveyor to level cans, which are discharged from filler by chucks (2). Made of Micarta, latter don't mar cans. Valve lock (3) lifts and turns to release valve.



MAGNETIC BRAKE (A) helps halt rotation of filler, which is stopped in 2/10 sec., or approximately the space occupied by four cans. An enclosed oil pump is incorporated at (B). It lubricates the meshing parts.



VALVE-ASSEMBLY CROSS-SECTIONS depict the operations of measuring-filling units. In this advanced design, the intake to cylinder and discharge to containers are controlled by a single plug-type valve.

On the upper outside of each piston is a roller. As bowl and pistons rotate, these rollers travel on an inclined track around the machine, lifting the pistons during the first 180 deg. of rotation and then forcing them down during the other 180 deg.

Rise of the piston draws product from filler bowl through valve intake port and into the cylinder.

Valve is then rotated by a cam so that its intake port is closed and its exhaust port opened. The downstroke of the piston then forces product in the cylinder through the exhaust port and into the container.

Lastly, another cam rotates the valve back to its intake position and the piston is again started upward in its filling cycle.

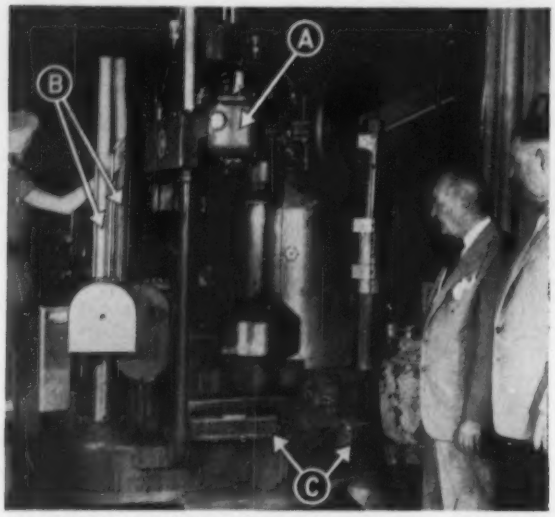
Amount of fill is governed precisely by the length of the piston stroke which, in turn, is controlled by the slope of the cam track. Latter is pivoted upward or downward simply by rotating the fill-adjustment screw. Thus the product fill may be regulated simultaneously at all stations even while the filler is in operation.

Empty containers are fed from a can chute, or a conveyor, to a screw that is synchronized with a starwheel. This in turn positions them in Micarta chucks, which carry them around a stainless steel table under the filling stations. Containers are then discharged to a conveyor with a straightline take off.

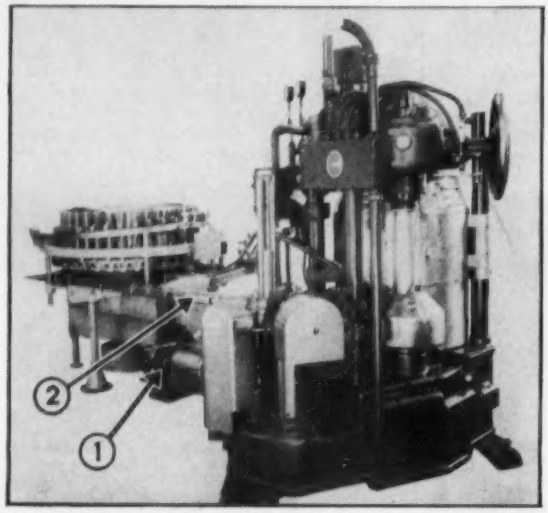
When there is no container under the valve, the device moves the valve opening cam out of engagement so the valve remains closed and the down stroke of the piston returns the product to the filler bowl.

These and other features assure accurate filling. In fact, for stated applications they guarantee fill within specified tolerances—usually $\pm\frac{1}{10}$ oz. for small containers, with

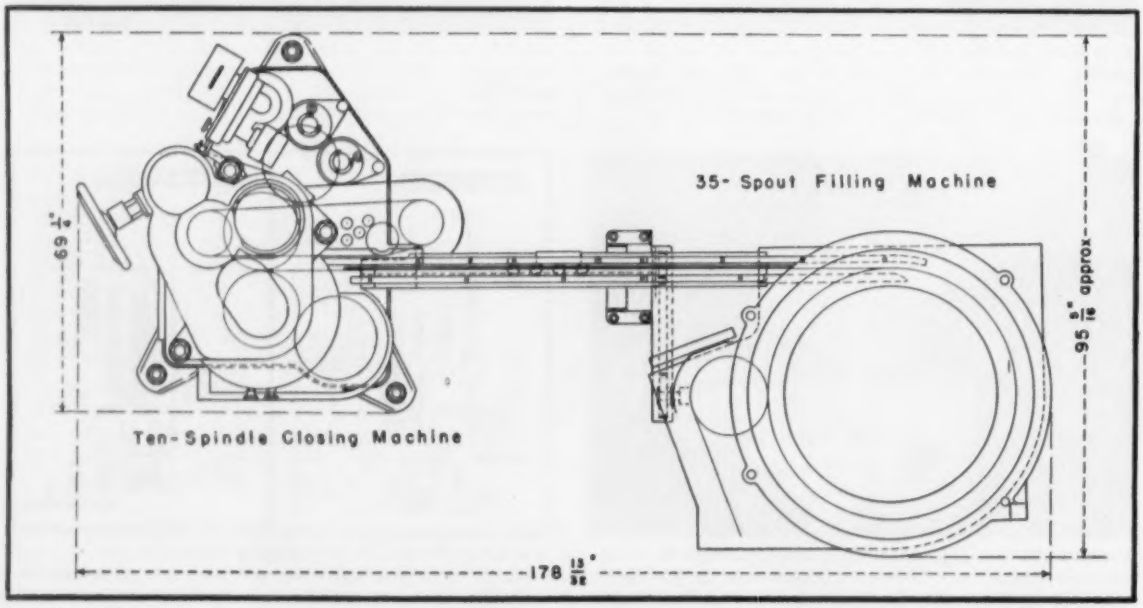
(*Turn to page 203*)



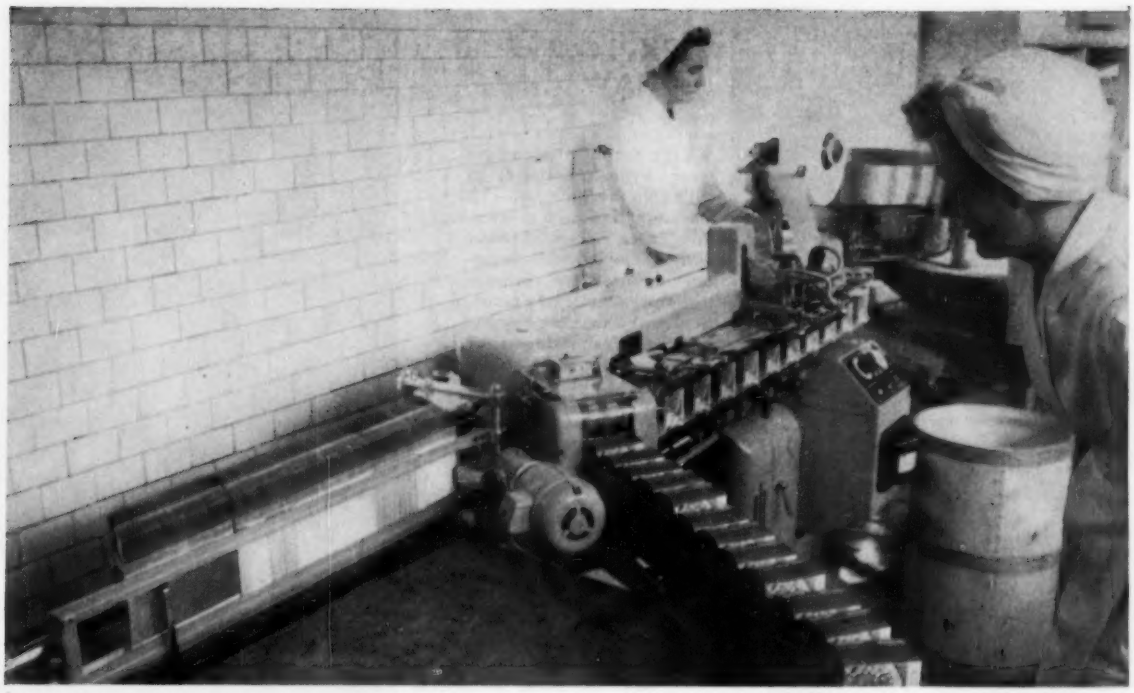
CLOSING MACHINE is powered by hydraulic motor (A), which also determines closing rate. Two feeds for covers (B) meet high-speed needs. Lubrication valves (C) are panelled for simple maintenance.



TIMING-IN-MOTION DEVICE (1) is between filler and closer. It compensates for variable torques at different speeds. Magnetic control (2) is set well in advance of the two cover-feeding units that it operates.



PLAN of filler-closer hookup reveals compactness—relatively small area required in proportion to high output.



"SHORT-CUT" MACHINE in action. Flat cartons are fed (left), opened (center), and move under synchronized filler (background). On return leg of loop, filled cartons are sealed by strips from paper roll. Then flaps are closed (center), and finished packages emerge (right foreground). Note grouping of controls (right center).

New Way to Package

Does Away With Bag Liners

GEORGE WILLIAMSON
McGraw-Hill World News, Sweden

Following the lead set by the U.S. in targeting more economical manufacture, foreign food processors are now utilizing automatic equipment—designed by native engineers—to trim costs and raise quality.

This trend is typified by Sweden's Björnekulla Fruit Industries, which is pinpointing the modern technique with a streamlined packaging unit.

▶ Using a special frozen food package, this equipment eliminates the inside carton-bag, leakage being prevented by a paper strip sealed under the flaps.

▶ Star benefit of this design is reduction of carton costs through savings in material—while increasing tightness of closure to prevent dehydration.

These factors make it probable that the new type container will soon be in demand among processors of such other products as lard, spices, cereals, cake mixes, puddings, and dehydrated soups.

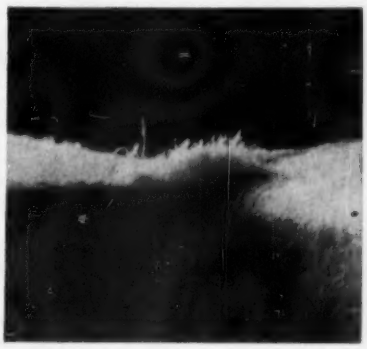
High Performance

At Björnekulla, four of the new Expresso packagers (patented by the maker, Akerlund & Rausing, Lund, Sweden) are turning out 9,600 packages per hour, an average, per machine, of 40 containers a minute. Even faster speeds are possible with smaller containers.

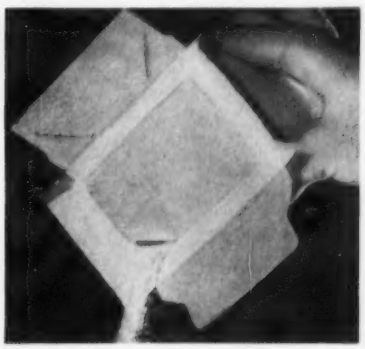
In operation, the equipment opens the flat cartons (fed from a 100-package magazine) and closes the bottom flaps. Cover paper is then fastened inside the bottoms before packages go to filler. After filling, the cover paper is sealed (see photo) over the product, and the top flaps are closed.

In manufacturing the carton, cuts between the flaps are not extended to the body of the carton. Hence, when

(*Turn to page 187*)



FIBROUS AREAS are left when corners are deliberately torn by unfolding flaps. This "conditioning" assures . . .



. . . TIGHT LEAK-PROOF closure with cover paper under heat-and-pressure sealing. Here package holds a powder.

ON EXPLOSIVE GAW . . .

"It's the most important issue ever presented in collective bargaining — a 'package' designed to wrap up union dissatisfaction with unemployment insurance, automation, concentration of sales and production in the first six months of the year, shut-downs for changeovers, short work weeks, and plant relocations."—William L. Dennis, professor of law, New York University

"A prime cause of this union move is the inadequacy of unemployment-compensation benefits in most states. Therefore industry should be doing what it can to get state benefits increased."—Secretary of Labor James P. Mitchell

Labor Issues *Get Really Ticklish*

1. Guaranteed Wages—*Guarantee dilemmas* 2. Taft-Hartley—*Definitely isn't dormant* 3. AFL-CIO Merger—*Sparks multi-potent power* 4. "Boulwareism"—*Brings new bogeys* 5. Welfare Funds—*Demand eagle-eyeing*

IVAN C. MILLER
Associate Editor, "Food Engineering"

Pressing labor issues—of today and of the very-near tomorrow—were given top billing in the "down to business" 1955 Personnel Conference just conducted by American Management Assn. at Chicago.

But the fact that the problems are all front-pagers must not lead the food processor to conclude they are questions "in somebody else's backyard."

In truth, each packs a potential that calls for a double look by every food-plant executive.

1—GAW LOOMS

As for assuring seniority personnel that they'll get a definite amount of employment during the year, we can say that certain food companies have been doing that for years.

In each case, this assurance placed both a moral and economic responsibility on management—that is, to conduct the business so as to provide a uniform level of employment throughout the year.

Through such functions as control of sales production, scheduling, warehousing, research, and new-product development, managements have succeeded—profitably—in stabilizing their employment.

But these voluntary stabilization attempts are entirely different from—and hence not to be confused with—the current demands of unions for a guaranteed annual wage (called GAW).

This union proposal (United Automobile Workers) was termed "the most complex and important issue ever presented in collective bargaining. Here, the speaker was William L. Dennis, professor of law, New York University.

"It is a package," he went on, "designed to wrap up a number of problems facing members of the union. These include dissatisfaction with (1) present rates of unemployment insurance benefits, (2) automation, (3) concentration of auto sales and production in the first six months of the year, (4) shut-downs for model changeovers, (5) short work weeks, and (6) relocations of plants in other areas.

Meaning of the Demand

The GAW proposal would assure the worker 40 hr. of pay from his employer in any week in which he performs any work, or was not notified in advance that he was laid off. However, if laid off, a 2-yr.-seniority worker available

for work and unable to find suitable employment elsewhere would be guaranteed 52 weeks' *normal* pay.

Employees with less seniority would be entitled to a guarantee of payments based on a formula of 1 week for each 2 weeks of service.

Payment under this guarantee would come from a trust fund to which the employer would contribute a percentage of his payroll (necessarily before taxes and regardless of profits). Where legally possible the trust fund payments would merely supplement the benefits which the employee would receive under unemployment insurance.

This UAW program is based on the presumption that financial incentives to the employer to stabilize employment will stabilize both work and income of the employees.

Might Drastically Alter Bargaining

Should such a GAW contract be negotiated, it might drastically alter the present balance of bargaining power between employers and unions. Unemployment that is beyond the control of the employer should be treated differently than employment over which he can exercise some reasonable control. Otherwise, the employer's financial incentives to stabilize production and employment as a means of lessening his contributions to the trust fund may be negated.

As negotiation nears, there are these big open questions: To what extent is the rank and file of the membership behind the demands? And are they willing to strike or forego wage increases in order to secure GAW?

Also there is that most important legal problem of integration of state unemployment benefits with GAW.

While GAW may present troublesome legal and economic problems, the decisions made by the negotiators for the individual companies and for the unions at the bargaining table will determine whether GAW will become an established part of our industrial life.

The burden of preparing for these negotiations is a heavy one. It requires an intimate and detailed knowledge of the company's products, the nature of their demand and predictability, the feasibility of storage, the kind of selling effort, expected new products, obsolescence of existing products, and the feasibility and cost of changing such factors, as well as a host of others, in the interest of stabilizing production and employment.

The personnel in industrial relations have acquired a new and heavy responsibility.

A prime cause of this union move, declares Secretary of Labor James P. Mitchell, is the inadequacy of unemployment compensation benefits in most states. Therefore, he said, industry should be doing what it can to get state benefits increased.

"I believe it is clear," he declared, "that present maximum payments are too low. No state law today would pay the majority of all workers protected by its provisions a minimum 50% of their weekly earnings. In fact, in only three states is the maximum weekly amount payable high enough so workers earning the statewide average weekly wage would get half of their wages as benefits.

"Three states' maximums are less than 30% of the statewide average weekly wage, and in 24 additional states, the maximum weekly amount payable is from 30 to 40% of the state-wide average wage for workers in covered unemployment. Benefit maximums should reach the level that President Eisenhower recommended in Jan. 1954."

The Secretary also stated that unemployment insurance is inadequate in terms of the number of weeks for which benefits are payable. Only four states provide all eligible workers with protection for 26 weeks—the goal which the President held to be necessary.

Another 21 states allow a maximum of 26 weeks for benefits, but many workers are entitled to fewer weeks, depending on their earnings or employment record in the previous year.

Maximum duration of benefits in the remaining states varies from 24 to 16 weeks. Five states will provide only 16-to-18 weeks of benefits, and another 15 states provide 20 weeks.

Government Pressure?

A boost in maximum weekly benefits is badly needed, he said, to assure injured workers of at least two-thirds their average weekly wages. In 1954 workmen's compensation benefits were equal to only 40% of average weekly earnings.

ON UNION WELFARE FUNDS . . .

"At least 15% of these welfare funds studied in New York State proved very bad. Expense of their administration sometimes ran as high as 42%, as employer trustees virtually abdicated their functions. But where they were active and alert, the funds were well-administered."—Judge Sol Gelb (speaker in photo), reporting on his welfare fund investigation

ON TAFT-HARTLEY . . .

"Conception of employers that things are going well on T-H is not justified. Those who have relaxed had better 'mount their jets' if they would influence the course of the hurricane now brewing."—Raymond S. Smethurst (seated center), attorney, Smethurst & Haslam, Washington, D. C.

ON AFL-CIO MERGER . . .

"A single big federation can be expected to prove much more than twice as potent as either AFL or CIO has been separately. Meanwhile, management will be relatively weaker, unless it fashions better political weapons."—Dr. Carroll R. Daugherty (far right), School of Commerce, Northwestern University, Evanston, Ill.

The Secretary warned that unless progress is made in improving state workmen's compensation benefits, the pressure for activities by the Government in this area will surely increase. "We in the Labor Department," he said, "are trying to help the states by developing an exemplary workmen's compensation law for a guide."

Other areas in which the Labor Department is trying to cooperate with the states and with industry include occupational safety, hours, and apprenticeship training. Since 1943 occupational injuries have decreased by 23% and the number of fatalities by 24%, while total employment has gone up 12% (these improvements representing savings for industry).

In Government contract work, the Department has recommended to Congress that it replace the Federal 8-hr. law with a general hours act to remove inconsistencies and to remedy the situation where employers on Government contract can work their employees 56 hr. a week with no overtime pay.

Meanwhile, the Bureau of Apprenticeship, and others, have been reorganized to improve services to both industry and labor.

2—TAFT-HARTLEY DYNAMITE

No change in the language of the Taft-Hartley Law is likely until after 1956, said Raymond S. Smethurst attorney, Smethurst & Haslam, Washington, D. C. But this does not mean labor is quiescent.

Conception of employers that things are going well on T-H is not justified in view of the apparent decision of labor to gather increased political strength before embarking on an all-out program of repeal.

The present stalemate is not a period of inaction, he pointed out. "In political and public opinion molding," he continued, "advocates of laissez faire for unions are moving more intensively and intelligently than at any time since their rise to great power in the late '30's.

"In the face of employer apathy and in the absence of critical national development, the next two years has been selected by labor unions to regroup forces before moving ahead once again in the campaign for greater political and economic control of the nation."

Unions no longer label T-H "the slave labor law," but instead they are directing their attacks somewhat inconsistently against the National Labor Relations Board for alleged anti-labor administration of the law.

"Actually," said Mr. Smethurst, "they are intent upon maintaining the present pro-labor majority of the Board and keeping the overwhelming pro-labor personnel in the General Counsel's office and in the field, where major influence of the agency's work is felt."

He then warned business executives that there is no reason to be complacent in facing developments now taking place in the area of Government administration of labor-management problems. As examples he pointed out—

"1. The attitude of the present Republican Secretary of Labor toward anti-closed shop laws in his recent speech before the American Federation of Labor Convention at Los Angeles, and

"2. The apparent aquiescence of the same Secretary in the joint efforts of a few big coal producers and John L. Lewis to impose upon all producers of coal a legal minimum wage of $2.01 to $2.34 per hour through machinery of the Walsh-Healy Act. The fact that Mr. Lewis has frequently declaimed against Government wage fixing, or that his new combination with coal producers smacks of an attempt to drive competition out of business, or that attempted wage fixing is even now being challenged in the courts apparently was deemed irrelevant.

"3. There is mounting evidence that some union leaders have not learned that excesses and abuse of power led to Taft-Hartley in 1947. These same leaders have forgotten that provisions to meet their growing monopoly power were deleted from the law in the hope that a more moderate approach would encourage a return to two-way negotiation and agreement. The militant and apparently adamant demands of UAW for a guaranteed annual wage, the current boycott techniques of the building trades, and the ambitious single contract aims of the teamsters smack of the same 'public-be-damned' attitude of 1946.

"The next two years," concluded Mr. Smethurst, "may decide whether the balance-of-power, self-government philosophy of T-H will continue, or whether the public will demand a more authoritarian approach. Those who have relaxed (after 1947, or even after 1952) had better 'mount their jets' if they would influence the course of the hurricane now brewing."

3—PORTENTS OF AFL-CIO MERGER

According to Dr. Carroll R. Daugherty, School of Commerce, Northwestern University, Evanston, Ill., an increase in the political influence of organized labor is likely to be the most important effect of the rapprochement between AFL and CIO.

"When it comes to electing labor's friends and defeating labor's enemies, and when it comes to lobbying in the legislative and administrative halls where labor's friends and foes sit, a single big federation can be expected to prove much more than twice as potent as either AFL or CIO has been separately. Meanwhile, management will be no stronger than it is now. It will be relatively weaker, unless it fashions better political weapons."

He continued: "If labor is convinced that management is not unsympathetic to the needs and problems of union leaders and members, and of unions as organizational entities, then labor is not nearly so likely to look to Government.

"There is a definite, inescapable relation between what labor asks of the Government and how hard it tries to get it, on the one hand, and the treatment labor gets from management on the other.

Losses vs. Gains

On the economic side, labor unity will mean that management will find itself bargaining with a single union in a field where two or more rival unions existed before. For some companies this may mean a relatively weaker bargaining position, since they will lose the opportunity to play one union off against another.

On the other hand, many companies found themselves caught in the middle between rival unions constantly in turmoil. And thus they have longed for the stability and security of dealing uninterruptedly with a single, secure union.

Union leaders will not be so eager to lose the advantages of being able to whipsaw one employer against another, reasoned Dr. Daugherty. It is doubtful that union mergers will, in themselves, lead to an increased demand for industry-wide bargaining. This management fear has little rational basis.

The only way to make sure of avoiding industry-wide bargaining is to prohibit it by law, either directly or by forbidding existence of national units.

The first method would disregard the interest of a number of employer groups "who love such bargaining because it stabilizes their highly competitive industries." An employer typically improves his bargaining position when he yields his individual decision-making freedom to that of an industry-wide association of employers.

The second method would establish the precedence of governmental interference with a fundamental democratic liberty, freedom of association. "Long ago the U. S. Supreme Court said that bigness in business, as such, was not socially reprehensible. We have laws against racketeering, extorsion, and feather-bedding. Let them be used if the unions, big or small, violate them. Or if the laws are inadequate let them be amended and used."

Though the labor movement as a whole will be stronger because of the merger, it is not likely to grow much faster than the economy because of the difficulty of organizing those who are still out of the movement.

Rise in Strikes?

If the 1955-56 level of business activity is assumed somewhat higher than it was in 1954, we may anticipate a much more than proportionate increase in the number and duration of strikes, the speaker said.

He based this expectation on the nature of the demands of some unions, particularly, of course, GAW, and also on the probable attitudes of some companies, not only toward the demand, but also toward the unions and their leaders.

4—"BOULWAREISM"—CON AND PRO

Taking issue with the practice of some companies, Dr. Daugherty stated that he was "afraid continuation or expansion of what unions call 'Boulwareism' will provoke serious trouble, maybe this year, if economic conditions are favorable to unions."

Boulwarism was described as the practice of going over union officials' heads to employees and to the public and adamantly taking refuge in abstract principles, like management prerogatives, rather than realistically dealing with particular concrete problems."

Dr. Daugherty urged managements to avoid trouble by renouncing certain major features of such practices. He went on: "If American workers, their unions, and their leaders feel that their managements and the Government—*i.e.*, their society—have given them a reasonable degree of satisfaction, no one needs to worry much about the formation of a labor party or a socialist state. There need be no despairing conclusions that in exhibiting the very American trait of always asking for more, unions will wish to take over the basic prerogative of managerial decision-making."

Opposing View

John J. McCarthy, consultant in employee relations training, General Electric Co., took issue with these comments on Boulwareism, thus defending the GE approach in going directly to the employee and to the public with rebuttals of previous statements made by the union to the same audiences.

He pointed out that GE had been a pioneer in supplying fringe benefits to employees, even to the extent of attempts to guarantee annual wages. He also cited plans for profit sharing.

"Not only had we provided good and remarkably steady jobs," he said, "but the number of them more than doubled in just a single decade. This had been accomplished in a continuing 'seller's market' on employee services. Anyone dissatisfied with his job could get another almost anywhere he wanted it. Yet we not only kept our old employees but more than doubled their number.

"Nevertheless, the bitter 1946 strike called by UE-CIO indicated clearly that not only a majority of our employees, but also of the press, merchants, clergy, teachers, politicians, and seemingly the community citizens in general, misunderstood both our performance and our intentions.

"A long, tough job lay ahead in overcoming this. Regardless of how good and attractive our jobs were in financial and other basic aspects, we had many problems. We had to develop a more adequate understanding of our past good performance in order to get the recognition and credit we deserved. We had to review our current performance to see how we could improve it. We had to deserve and gain the understanding and approval of our employees and community neighbors.

"First we initiated, and ever since have practiced, this 9-point program: 1. Good pay and other material benefits, 2. good working conditions, 3. good bosses, 4. a fair chance to get ahead, 5. steady work, 6. respectful treatment, 7. full information, 8. important and significant work, and 9. rewarding association on the job.

"Another problem we faced was the regrettable and distasteful—but vitally necessary—task of doing our part to correct any unwarranted confidence in any unsound proposals by union officials.

"Skillful propaganda by certain union officials and other of our critics had filled the communication void created by the traditional reluctance of ourselves and other businessmen to speak up about our good intentions and performance.

"This had prevented too many people from recognizing the growing gap between the thoroughly good theory and potentiality of unions and the too-frequently bad ideas, practices, and proposals of certain individual union officials.

"Regardless of how untrue it was, every improvement in employee welfare was getting to be regarded as something which we had greedily and viciously resisted, and which had to be forced out of us unwillingly. And certain of the union officials were too often regarded as friends of the worker and public even when sponsoring ideas and action quite contrary to the best interests of employees and public.

"There was obviously wide dangerous misinformation to combat in order to work for the balanced best interest of all.

"Who had been at fault in letting this misinformation go unchallenged and grow to such proportions? The main fault was clearly ours. It seemed incredible that our intelligent employees would look directly at our superior jobs and see them as bad instead of good.

"But even intelligent people have to have access to the facts, so we reluctantly entered upon positive informing—and debunking and disillusioning—as the necessary move to make the true facts stand out clearly. We were not only going to *do right voluntarily*—we were going to have it *known* that we were.

5—WELFARE-FUND WARNINGS

Judge Sol Gelb who, on behalf of the New York State Superintendent of Insurance, headed a recent investigation of the handling of union welfare funds in New York, first reported the good news—

1. The overall picture of union welfare funds in the state was not as bad as had been anticipated.

2. Most funds proved to be honestly administered.

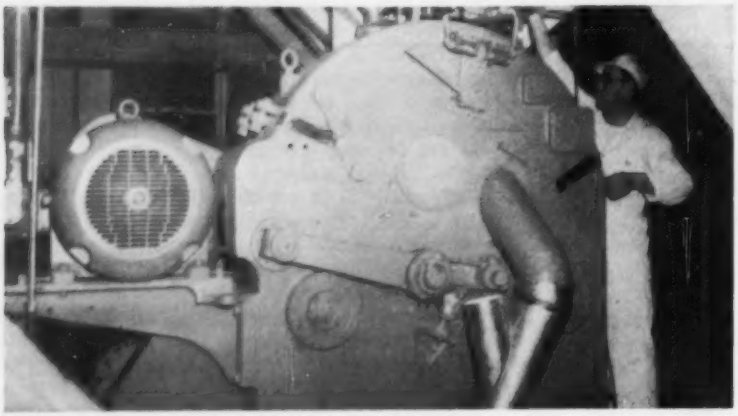
But, he cautioned, this may not be typical of other states.

At least 15% of the New York funds studied proved "very bad," according to the Judge. Principal weaknesses were (1) high ratio of administrative cost to worker contributions, and (2) lack of relation between the funds contributed and the expenditure for insurance.

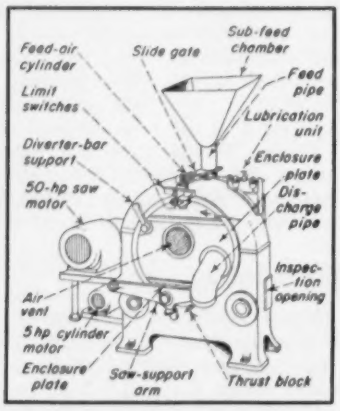
He spotlighted these troubles: Trustees having no criteria for deciding how much benefits to buy. . . . Funds with big surpluses, but nothing in mind for their use. . . . And simple payroll padding. Other abuses: Loans from welfare

(*Turn to page 167*)

Special Mill for Long-Keeping Whole Wheat Flour



AT STOCK & SONS Hillsdale, Mich., plant, this unique machine is milling entire wheat berry into flour by entirely new principle. Here, whole grain is split (rather than ground) into the new flour at 4,000-lb.-per-hr. rate as it is centrifugally forced against a series of high-speed saw blades.



DETAILS of Rotarizer. It mills flour in which infestation does not develop. Unit is adjustable to reduce grain to different degrees of fineness.

Revolutionary Impact Mill Makes Stable Whole-Wheat Flour

New technique forms a different flour with extended storage life. And bread made from it retains moisture longer, thus stays fresh longer

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Recently introduced is a novel milling machine—the Rotarizer*—that employs a radically new principle to turn out an entirely different, superior quality, whole-grain flour.

▶ **Not only does the new flour make excellent bread but it also has been very successful in other quality whole-wheat items, such as donuts, cookies, rolls, muffins, pancakes, waffles, etc.**

But revolutionary to millers is the method employed here. The grain is mechanically split, rather than ground, as with conventional methods involving use of stone-, roller-, or hammer-mills.

The splitting is achieved by tossing centrifugally-spun grain over a bar that, in turn, diverts it into rapidly revolving saw blades with special teeth.

Splitting of the grain by the high-speed saws produces the different-type flour, one free of ruptured starch and oil cells. Result is a retarding of rancidity, giving a flour having extended keeping quality. Also, the bran is not separated from the grain, and the flour particles do not have sharp edges to cause digestive irritation.

Quality of this 100% whole wheat flour is stated to surpass that ground by the old-style stone technique. And the flour reportedly is the first of the kind (no portion removed during milling) to permit large-quantity shipments to bakers. The flour has held up six months after shipment without evidence of rancidity or other quality-degrading changes.

What's more, infestation is checked in the flour because of the action of the milling operation.

Since starch cells remain intact, about 20% less starch is released. As a result, shipments are made in smaller bags.

First unit (18x42 in.) was recently installed at the mill of F. W. Stock & Sons, Inc., Hillsdale, Mich., where 4,000 lb. of the whole grain flour is being milled hourly. Capacity of the machine can be increased by merely changing speed of the motors.

How Machine Mills

To start the new mill, the "On" buttons are pushed, actuating the revolving horizontal cylinder, series of saws, and timers for loading and unloading the unit.

The loading timer energizes solenoid valves that operate an air cylinder for a pre-set time—1¼ sec. During this short period, the air cylinder, operating under a pressure of 30 psi., pneumatically opens a horizontal slide gate to charge a 30 lb. batch of grain (14½% protein, dark No. 1 northern Spring wheat) into the turning cylinder.

Length of time that the slide gate

* Developed by Whole Grain Products, Inc., Cleveland, and installed at Stock on licensing arrangement.

remains open determines amount of grain fed into the mill from two 500-lb. capacity bins.

With the batch of grain in the mill, the loading timer next energizes a second timer that carries out the milling cycle. For instance, the pre-set at Stock & Sons is for 30 sec. to mill a coarse flour, 40 for medium, and 50 for fine.

At the end of the milling cycle, the second timer energizes solenoids that operate a second air cylinder to activate a discharge scraper that dumps batch of milled flour. At the same time, a trip lever reaches its maximum stroke, striking a limit switch which de-energizes solenoids to return the discharge scraper to neutral. On the return stroke, this lever trips another limit switch to re-set both timers for the next complete loading, milling, and discharge cycle.

Any violent action of air cylinders from excessive pressure is avoided through a pressure regulator on the lubricating unit.

Inside the mill, the 30-lb. batch of grain is reduced as it is alternately spun by the horizontal cylinder and thrown (in making coarse flour) 70 times in mid-air against the high-speed saws during a 30-sec. milling period. The 106 saws (16-in. size) are spaced ⅛ in. apart and revolve clockwise at a 2,400-rpm. rate. The counter-clockwise revolving cylinder runs at a speed of 140 rpm.

To drive this machine, 55 hp. are required—5 for the cylinder's motor and 50 for the saw's motor.

Baking Characteristics

Commercial use of this flour for 100% whole wheat bread at Waltham's Bakeries, Oxford, Mich., revealed need of certain modifications in the formula and processes.

As for formula changes, more sugar and yeast are required to attain the desired active fermentation. Added are 5% yeast for a 5-hr. sponge fermentation and 13% sugar for the dough.

Additional sugar produces a sweet-tasting loaf. Extended fermentation results in a greater amount of lactic acid. And a maximum amount of salt (2½%) is introduced to bring out —along with the sugar and acid—the taste-tempting flavors of a premium quality 100% whole wheat bread.

The 2½-hr. (or longer) fermentation increases absorption of moisture. At least 70 lb. of water are required for 100 lb. of flour—so that there is enough moisture to hydrate portions of the flour with uncrushed cells.

Result is a not-too-dry bread that retains its freshness for at least 10 days. In most instances, then, the baker can bake every-other-day (rather than daily). And chances of the baker having to take back stale bread are greatly minimized.

Bread made from this *"Whole of the Wheat"* flour has a taste different from that made from other whole wheat flours. It has a delicious nutty whole grain flavor, with no bitter aftertaste, and it makes tasty toast.

In addition to extending fermentation time, other processing changes must be made. Because of the greater tolerance of the flour, higher mixing speeds are necessary.

Cooler sponges, it was found, produce the most desirable bread flavor. Sponges must, therefore, be set at 70 deg. F., and then returned to the mixer at 78 F. for best results.

A moderate amount of steam is called for during proofing and baking. Sufficient for cabinet-proofing is a temperature of 95-96 deg. F. Baking is carried out with lower temperatures—at 395 deg. F. for 35 min.—to produce a high-volume loaf, with light flaky crumb. The loaf also retains more moisture than other whole wheats.

In a recent Stock-conducted consumer test involving 1,000 people, 700 preferred bakery-baked Rotarized whole grain bread to home-made white.

Bread Formulas

To make 100% whole wheat bread by sponge-dough method: Mix for 3 min. at second speed in an 80-qt. Hobart mixer: Rotarized flour, 16 lb.; water (80-82 F.), 12 lb.; yeast (dissolved in water), 10 oz.; shortening, 8 oz.; dough improver (dissolved in water), 1½ oz.

Then mix this sponge for 2 min. in 3rd speed on the 4-speed mixer, and with temperature at 80-84 F. Next set the sponge at room temperature for 2½-3 hr.

Now prepare the dough by adding to the sponge: Brown sugar, 3 lb.; salt, 10 oz.; milk powder, 1½ lb.; shortening,, 12 oz.; yeast (dissolved in water), 8 oz.; water (80 F.), 8 lb.; Rotasized flour, 14 lb.

Temperature of the dough should be 80-84 F. Then allow dough to set 1 hr., after which scale it off into 18-oz. pieces that are bench-molded. Again allow dough to set, but only 10 min., when it is rolled and panned. Finally bake the dough at 390-395 F. for 30 min. to produce 50 loaves.

(*Turn to page 171*)

Makes Tasty, Nutritious Bread and Donuts

BREAD baked from the flour has rich, wheaty flavor, keeps fresh over 10 days. Required, however, are changes in formula and processing.

TASTY DONUTS, test-made at Stock's from mix prepared with the flour, retain moisture, thus have extended shelf-life. Flour is also recommended for other items.

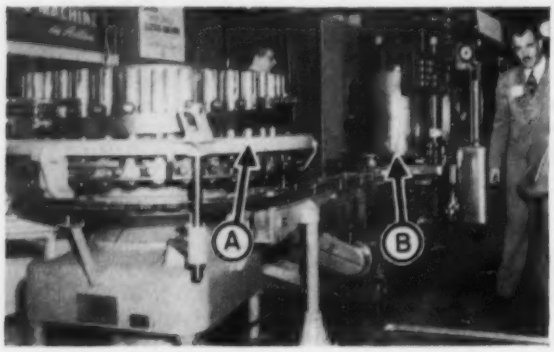
36 New and Better Machines Seen at Industry Show

Innovations and advances exhibited at recent Canners Show increase efficiency in many unit operations of food manufacture, including:

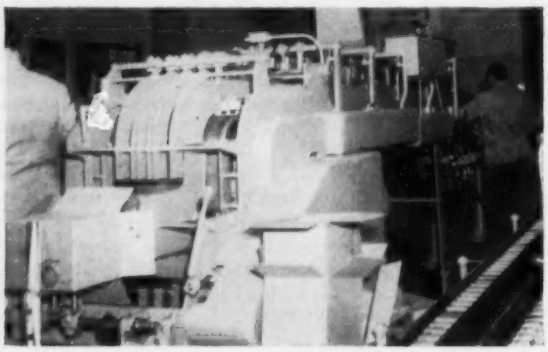
PACKAGING • MATERIALS HANDLING • SANITATION
PROCESSING • QUALITY CONTROL • SEPARATION

12 PACKAGING MACHINES:

Emphasis on higher speeds, precision filling, and improved sanitation . . . Unique olive packer



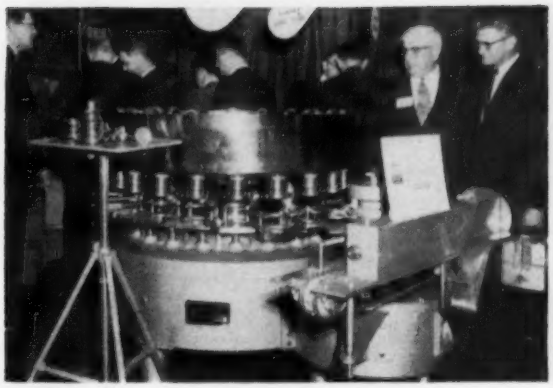
800 CANS PER MIN. are filled on 35-station piston filler (A) and then sealed on 10-spindle closing machine (B). Units can exceed 1,000 per min. Filler made by The Pfaudler Co., Rochester, N. Y. (70A), features magnetic brake, electrically controlled no-can-no-fill mechanism, adjustable tilt track, and precision filling. Can closer displayed by Continental Can Co., Chicago (70B), is equipped with hydraulic motor drive, powered from electrically driven remote hydraulic pump to assure controlled acceleration and deceleration.



1,000 CANS PER MIN. are case-packed by this new machine displayed by Standard-Knapp Div., Emhart Mfg. Co., Portland, Conn. (70C). Cans travel single-file in upright position to vertical, oscillating dividers that separate them into 3 or 4 rows on a wire-mesh conveyor. Magnetic drum picks up the pattern of cans and loads them into shipping cases that are automatically formed and inserted over a loading funnel. Loaded case is then discharged from automatic case-packing machine onto an off-bearing conveyor.

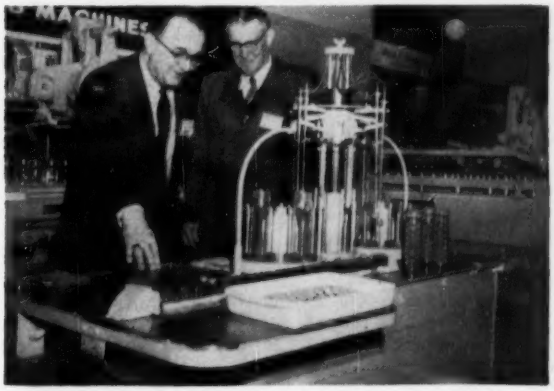
LATEST rotary piston filler with 27 stations also handles up to 800 jars or cans per min. Designed for easy removal of accessible parts for cleaning. Accurate filling controlled by eccentric cam, adjustable while machine operates. Models available for top-, bottom-, or gravity-filling. Manufactured by Librascope, Inc., Glendale, Calif., and displayed by W. F. & John Barnes Co., Rockford, Ill. (70D)

12-STATION, straight-line filler handles semi-liquid and semi-solid products. New air-operated, air-free valves cut off instantly, regardless of cycle speed, to accurately fill up to 300 glass, plastic, or metal containers per min. Contact parts and parts around filling zone are of stainless steel. Operates only when containers are at filling station.—The Filler Machine Co., Inc., Philmont Club Station, Pa. (70E)

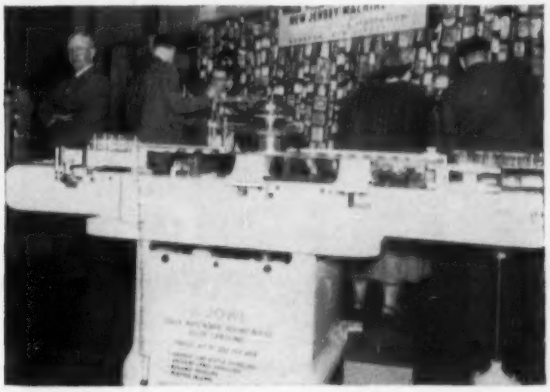


EMPHASIZED on new 20-station syruper are special filling valves with efficient venting system, easy adjusting valves to vary headspace in cans, three adjustable supporting units for raising filling bowl over can-carrying table, and adjustment for timing in-feed worm and wheel-feed turret while machine is in operation. Speed exceeds 200 No. 2½ cans per min.—Food Machinery & Chemical Corp., San Jose, Calif. (71A)

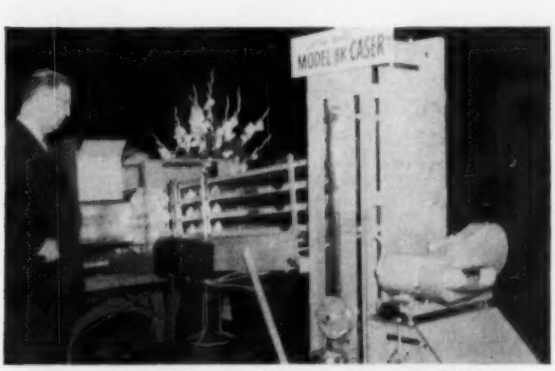
ROTARY, 8-pocket unit dispenses salt into cans at speeds up to 300 per min. Salt is gravity-fed from 50-lb. capacity hopper to pockets of filler with plow-type leveling bar. Pocket plate and in-feed starwheel replaceable for different fills. Unit could also be adopted to dispense salt and MSG, salt and calcium sulfate, and salt and spices. Displayer: Diamond Crystal Salt Co., St. Clair, Mich. (71B)



FIRST-OF-ITS-KIND dual-head machine place-packs up to 96 olives per min. into glass jars. Two operators spot olives, two at a time, onto intermittently moving pocket conveyors. The vacuum fingers on 4-head turret pick up olives and place them in jars. When they're filled, turret automatically indexes empty jars into position for filling. Maker: Elgin Manufacturing Co., Elgin, Ill. (71C)



AUTOMATIC, rotary bottle labeling machine operates at speeds up to 10,000 per hr. Features quick change from one bottle or label-type to another, no-bottle-no-label device, quick removal of label and glue hoppers without need of tools, and accurately regulated glue container. Built in Germany for New Jersey Machine Corp., Hoboken, N. J. (71D)



600-CAN-PER-MIN. case-packer elevator feeds cans onto multi-tier accumulating tracks. Portable machine also features soft-motion discharge to reduce jarring and can-bead damage. Manufacturer: Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. (71E)

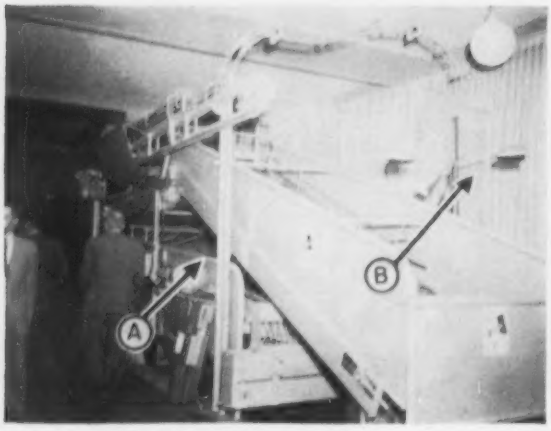
FULLY AUTOMATIC machine wraps cans into multi-unit cartons at up to 900 cans/min. rate. Machine does not require use of glue or staples to form the carry-home package. Displayer: Cluster-Pak Div. of Atlanta Paper Co., Atlanta. (71F)

CASE PACKER for 46-oz. cans handles up to 12 cases per min. Load of 12 cans conveyed to table is tipped into empty case, which drops onto carry-away conveyors.—Manitowoc Eng. Co., Manitowoc, Wis. (72A)

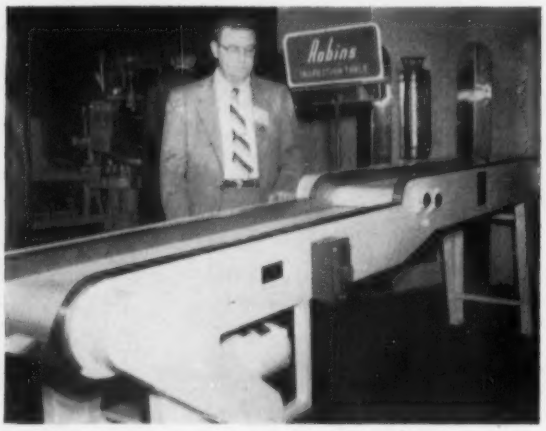
CAN CRUSHER receives cans in throat between converging heavy-duty belts that crush them as they move to discharge end. Roughened belt-links prevent slippage. —F. H. Langsenkamp Co., Indianapolis. (72B)

6 HANDLING UNITS:

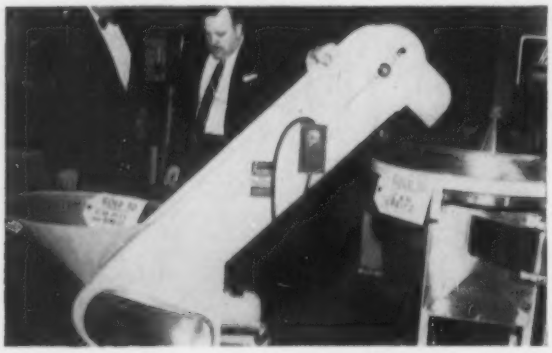
Specially designed equipment for moving empty cans, and conveyors for handling products . . . Several plastic belts



CASE UNLOADER empties cans onto unscrambler (A). Empty cans are fed into unscrambler hopper. Pneumatic elevator (B) "air lifts" empties into runway that takes them to filling machine. Advantages: Absence of wear-out moving parts and prevention of damage to cans.—Dudley Machinery Corp., Mountain View, Calif. (72C)

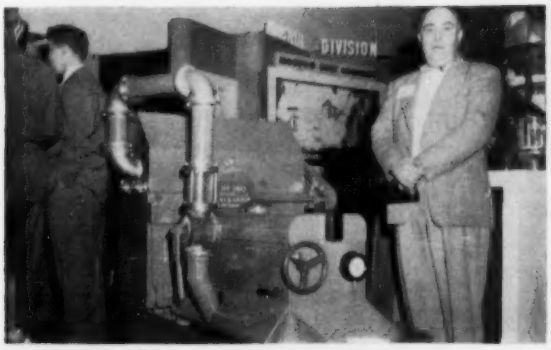


NEOPRENE inspection belt comprises readily removable stainless steel side flashing. Belt turns over product as it drops. Inspection belts available in different sizes for checking a variety of products, such as fruits and vegetables. Manufacturer: A. K. Robins & Co., Inc., Baltimore. (72D)



ELEVATOR with hopper and power-driven cleated belt takes labor out of lifting materials into process units. Casters under frame make elevator portable.—A. K. Robins & Co., Inc., Baltimore. (72E)

TEFLON-COATED metal belts are designed for handling of sticky products. Plastic is spray-coated and baked on belt. Displayer: The Cambridge Wire Cloth Co., Cambridge, Md. (72F)



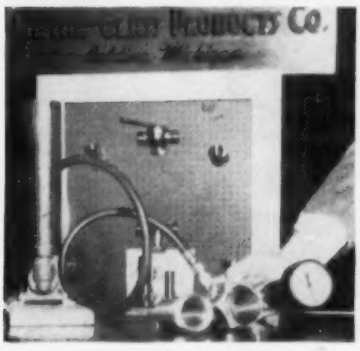
HYDRAULIC ELEVATOR consists of floor-level hopper to facilitate dumping of material along three sides. Unit is equipped with revolving scavenger screen to clean water for re-use and has fresh water sprays to clean screen.—Scott Viner Co., Columbus, Ohio. (73A)

NYLON table-top conveyor offers these benefits: It's Sanitary, light in weight, low in cost, smoother handling, corrosion-resistant, simple to change-over, quiet in operation, readily cleaned, easy to maintain and container-protecting.—Chain Belt Co., Milwaukee. (73B)

3 SANITARY "AIDERS":

Emphasis on simplifying plant sanitation chores . . . A jet sprayer, hand-type pipe fitting, rust remover

NEW JET CLEANER is of rotary type to facilitate movement of unit in all directions. Employs solid stream of hot chemical concentrate and solid jet of high-pressured hot water. Maker: Sellers Injector Corp., Philadelphia. (73C)

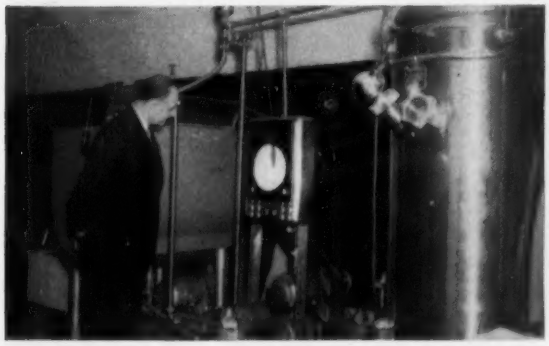


STAINLESS STEEL, sanitary fitting can be hand-tightened to pipeline to withstand leakage under high pressures or vacuums. Scalloped nut screws onto a ferrule fastened to pipe with "O"-ring.—Metal Glass Products Co., Belding, Mich. (73D)

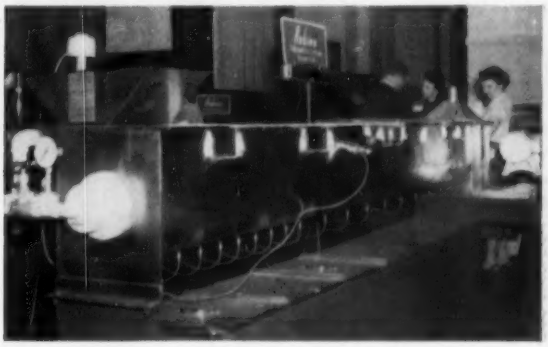
RUST REMOVER reconditions metal process-belts and other equipment without affecting sound surface or producing acid fumes. The alkaline material eliminates separate cleaning, paint-stripping, and de-rusting—Oakite Products, New York. (73E)

7 PROCESSING UNITS:

Progress in deaerating, blanching, slicing and cooking of products . . . Other units, too



DEAERATOR comes as package-unit with closed stainless tank. It maintains precise vacuum and temperature regardless of product flow—achieved by modulating valve sensitized by accurate liquid-level control. Product passes through heat-exchanger and is diverted to tank when temperature is not right.—Metal Glass Products Co., Belding, Mich. (73F)

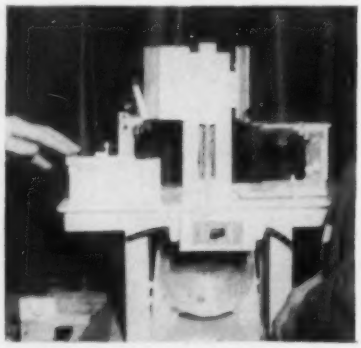


CONTINUOUS steam unit designed to blanch diced carrots in 2 min. at rate of 2,000 lb. hourly. Handles other products. It's of stainless steel construction with removable covers. Worm screw moves products through 14-in. x 12½-ft. blancher. Equipped with clean-out drains at bottom. Manufacturer: A. K. Robins & Co., Inc., Baltimore, Md. (73G)

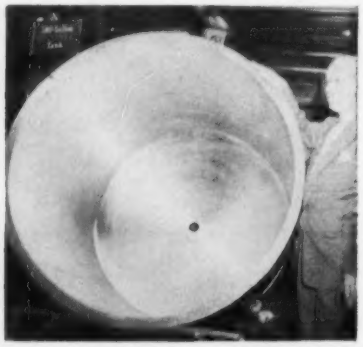
4-TON-PER-HR. bean slicer features greater hopper height to feed more beans onto aligning bed and through knives. Level of bed is adjustable for greater gravity feed.—Food Machinery & Chemical Corp., San Jose, Calif. (74A)

GAS-FIRED aluminum kettle (20-40 gal.) gives quick, even heat distribution. Has non-drip cover, sanitary draw-off valve, and air jacket. New knives with grooved non-slip handles also shown.—Aluminum Cooking Utensil Co., Inc., New Kensington, Pa. (74B)

DUAL mixer-cooker has hydraulic-tilt agitator with blades on concentric, counter-rotating shafts, nylon scrapers, and oilless gear box. Sanitary kettle is equipped with inlet-steam spreader.—Hamilton Copper & Brass Works, Cincinnati. (74C)



HONING DEVICE speeds sharpening of corn-cutting knives. Carborundum stones are driven by Scotch gear to sharpen outside edge of knives to proper bevel and to maintain inner bevel—Food Machinery & Chemical Corp., San Jose, Calif. (74D)



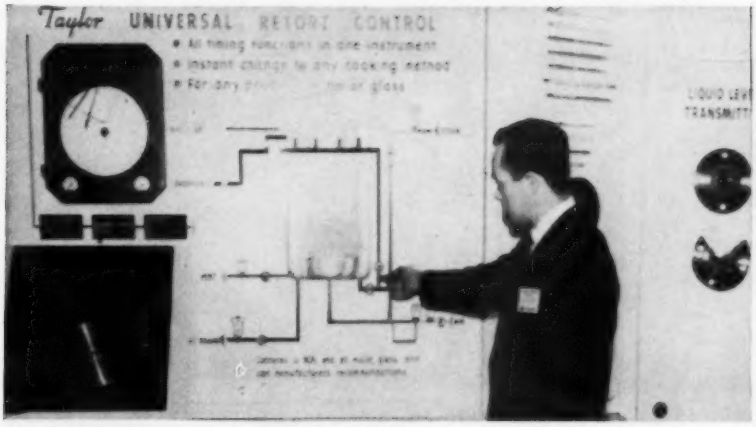
INCONEL TANK is constructed to hold highly corrosive solutions, such as salt brine and highly acid products like vinegar, juices, etc. Long-life tank is built in the various standard sizes by F. H. Langsenkamp Co. (74E)

4 CONTROL TOOLS:

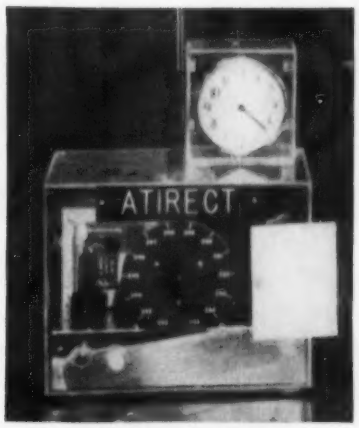
Process time-temperature integrator . . . Universal cook controller . . . Automatic speed regulator . . . X-Ray inspection unit

X-RAY INSPECTION provides fast, easy, accurate detection of infestation, effectiveness of fumigation, and defects in grains and other solid materials.—X-Ray Department, General Electric Co., Milwaukee. (74F)

AUTOMATIC, pneumatic-adjustment variable-speed drive improves control of process variables such as pressure, temperature, liquid level, flow, and speed.—U. S. Electric Motors, Inc., Milford, Conn. (74G)



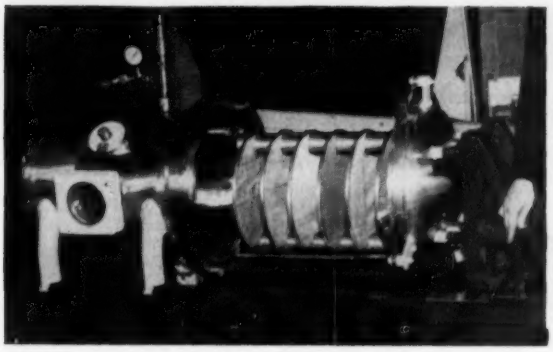
MULTI-COOK control system for canning retorts provides unusual degree of flexibility in sterilizing operations. This complete, integrated system can be quickly switched to different process schedules, for different products, packed in either tin or glass. Heating, venting, and cooling are automatically regulated. Controller has process-program disk with easily moved process-cycle actuating points on its periphery.—Taylor Instrument Cos., Rochester, N. Y. (75A)



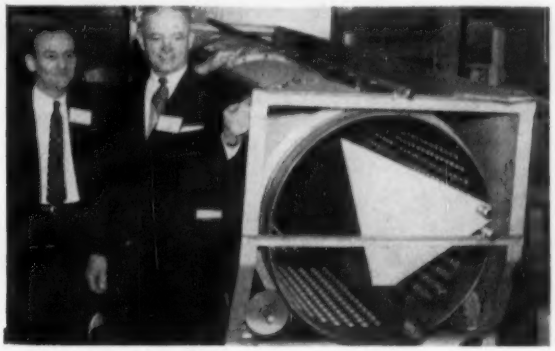
TOTAL-HEAT TIMER uses simple analog computer to regulate heat process so as to compensate for temperature variations. Will also integrate other variables with time.—Aseptic Thermo Indicator Co., N. Hollywood, Calif. (75B)

4 SEPARATING DEVICES:

Quickly cleaned filter . . . Variable pneumatic separator . . . Advanced shaker screen . . . Perforated drum



EASY-OPEN FILTER has hydraulic cylinder that moves shell to open and expose all plates in 60 sec. for cleaning. Head is fastened to shell, or released, by one lever movement.—Sparkler Manufacturing Co., Mundelein, Ill. (75C)



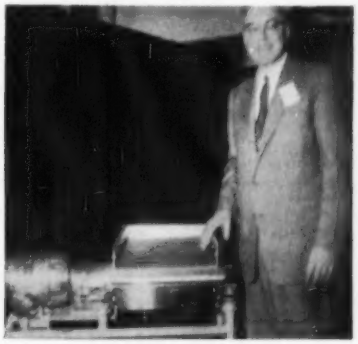
ROTARY, perforated drum removes slivers and nubbins from French-sliced spuds to up-grade product at reduced operating cost. Capacity: 2,000-2,500 lb. of potatoes per hr.—Food Machinery & Chemical Corp., San Jose, Calif. (75D)

MORE INFORMATION

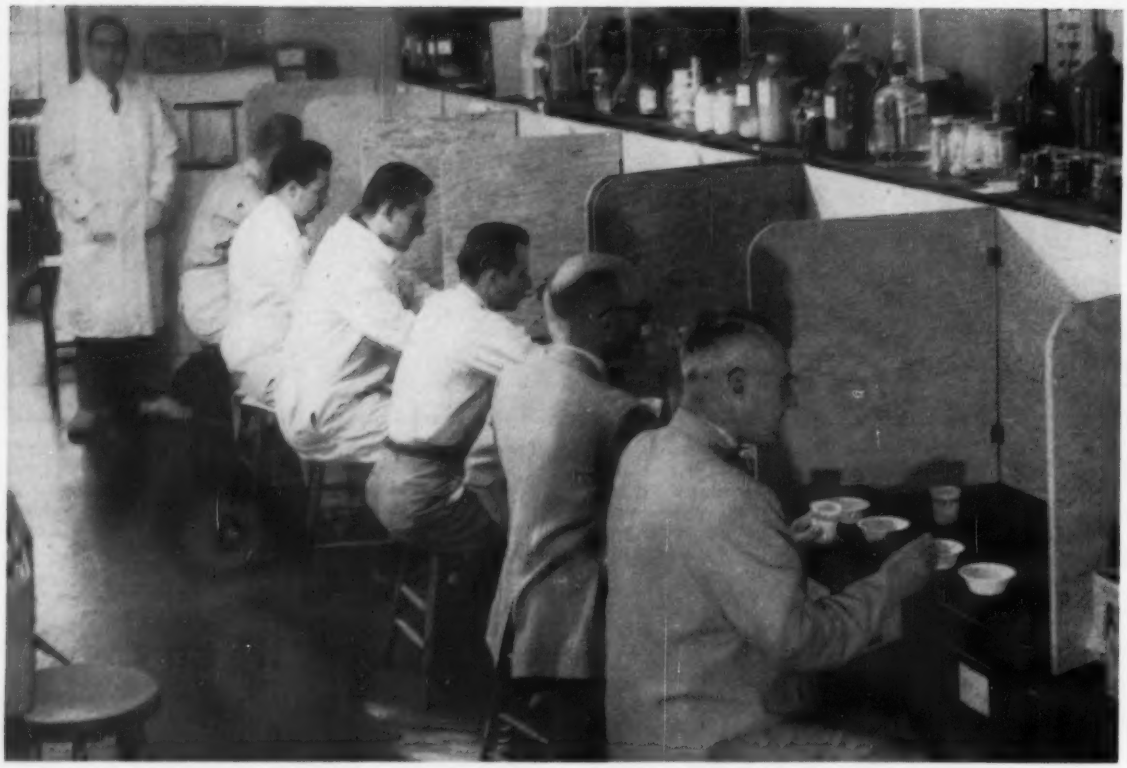
about any of the equipment illustrated and described on this and the preceding five pages can be obtained by circling the appropriate key numbers on the Reader Service Coupon (inside back cover).

Key number for each item is given in caption under picture.—The Editors

PNEUMATIC separator is equipped with variable-control vibrating feed for automatically cleaning and sorting wet, fresh products. Capacity: Approximately 3,000 lb. per hr.—Electric Sorting Machine Co., Grand Rapids. (75E)



GYRATING SCREEN for peas, beans, cheese, and other products, has removable stainless steel dewater deck that's spring-mounted. Balanced units have only two bearings.—Simplicity Engineering Co., Durand, Mich. (75F)



Taste panels find that MSG flavor improvements are retained by various frozen foods over many months—solid assurance to the packer that . . .

MSG Has "Staying Power"

Also determined are optimum amounts of glutamate to use, as well as approximate costs for six different frozen foods

M. PATRICIA KEARNS, IRVING S. FAGERSON and CARL R. FELLERS

First author with The Huron Milling Co., New York City; latter two with Department of Food Technology, University of Massachusetts, Amherst

With confirmations that monosodium glutamate (MSG) benefits the flavor of frozen vegetables, seafood, meats, and poultry,* it was pertinent to attack this question—

"*What is the minimum amount of MSG necessary to improve the flavor of these foods during a year's storage?*"

Accordingly, some of the foods named, as well as some frozen prepared foods, were tested. In addition, effect of storage on foods containing MSG was studied.

Results: It was specifically indicated not only that addition of the proper amount of MSG bettered flavors of the products—but also that the improvement is still apparent after a year of storage.

Thus, the frozen-food packer is assured his product will reach the consumer—several months after packing—with a better flavor because of the added MSG.

* Shuey, G. A., Eichenberger, W. R., "Monosodium Glutamate Sharpens Flavor of Quick-Frozen Foods," *Quick Frozen Foods*, 12, 13 (1951); Norton, K. B., Tressler, D. K., and Farkas, L. D., "The Use of Monosodium Glutamate in Frozen Foods," *Food Technology*, VI 405 (1952)).

And here are approximate costs of treating 100 lb. of product with MSG:

Haddock 33c., or ⅓c. per pound package.
Clam chowder 20c., or ¼c. a lb.
Chicken-a-la-king 33c., or ⅓c. a lb.
Rosefish fillets 33c., or ⅓c. a lb.
Beef stew 40c., or 2/5c. a lb.
Codfish cakes 33c., or ⅓c. a lb.

Steps in Evaluations

Where possible, the products were packed under commercial conditions modified only to permit incorporation of MSG at four levels of concentration. Products and amounts of added MSG (percent by weight) were as follows: *Clam chowder*, 0, 0.125, 0.20, and 0.25; *haddock fillets*, 0, 0.125, 0.15, and 0.20; *beef stew*, 0, 0.125, 0.20, and 0.25; *chicken-a-la-king*, 0, 0.15, 0.20, and 0.25; *codfish cakes* (pre-cooked), 0, 0.125, 0.15, and 0.20; and *rosefish fillets* (ocean perch), 0, 0.125, 0.15, and 0.20.

For clam chowder, beef stew, and chicken-a-la-king, sufficient amounts of MSG, based on weight of the batch

in the kettles, were added to give desired final concentration of MSG.

For codfish cakes, the proper amounts of MSG were incorporated in batches of codfish and potatoes during the mixing operation carried out prior to forming and frying the cakes.

Desired levels of MSG in both rosefish and haddock fillets were obtained by pre-weighing quantities of MSG into capsules. These amounts added to 1 lb. of fillets were enough to provide the levels of MSG required.

Contents of each capsule were dusted over both sides of the fillets in the 1-lb. package. To obtain more uniform distribution of MSG over the surface of the fillets, dusting was carried out with an electrically-driven vibrator screen device.

Packaging and Storage

The fish fillets and codfish cakes were packed in waxed folding cartons with a waxed-paper overwrap. The clam chowder was packaged in an aluminum-foil box with crimped-on cover. Beef stew and chicken-a-la-king were put up in waxed-paper cups fitted with tabbed insert-type closures.

All packaged samples were frozen immediately, then stored in a room kept at −10 deg. F. (±2 deg.). Here, they were held until withdrawn for organoleptic evaluation. At stated time intervals, sample packages were taken out and prepared according to the following directions:

Clam chowder, net weight 14 oz.: Add 1 pt. milk to contents and heat in covered double boiler over boiling water for 25 min.

Haddock fillets, 16 oz.: Bake in oven at 350 deg. F. for 45 min.

Beef stew, 7 oz.: Heat over boiling water in a covered double boiler for 25 min.

Chicken-a-la-king, 7 oz.: Heat over boiling water in a covered double boiler for 25 min.

Rosefish fillets, 16 oz.: Bake in oven at 350 deg. F. for 35 min.

Codfish cakes, 12 oz.: Heat in oven at 400 deg. F. for 20 min.

Taste panel members were drawn from a group of previously trained and experienced people. Then acceptability of each product was determined by rating on a 10-point scale, those samples with the highest acceptability receiving the highest scores.

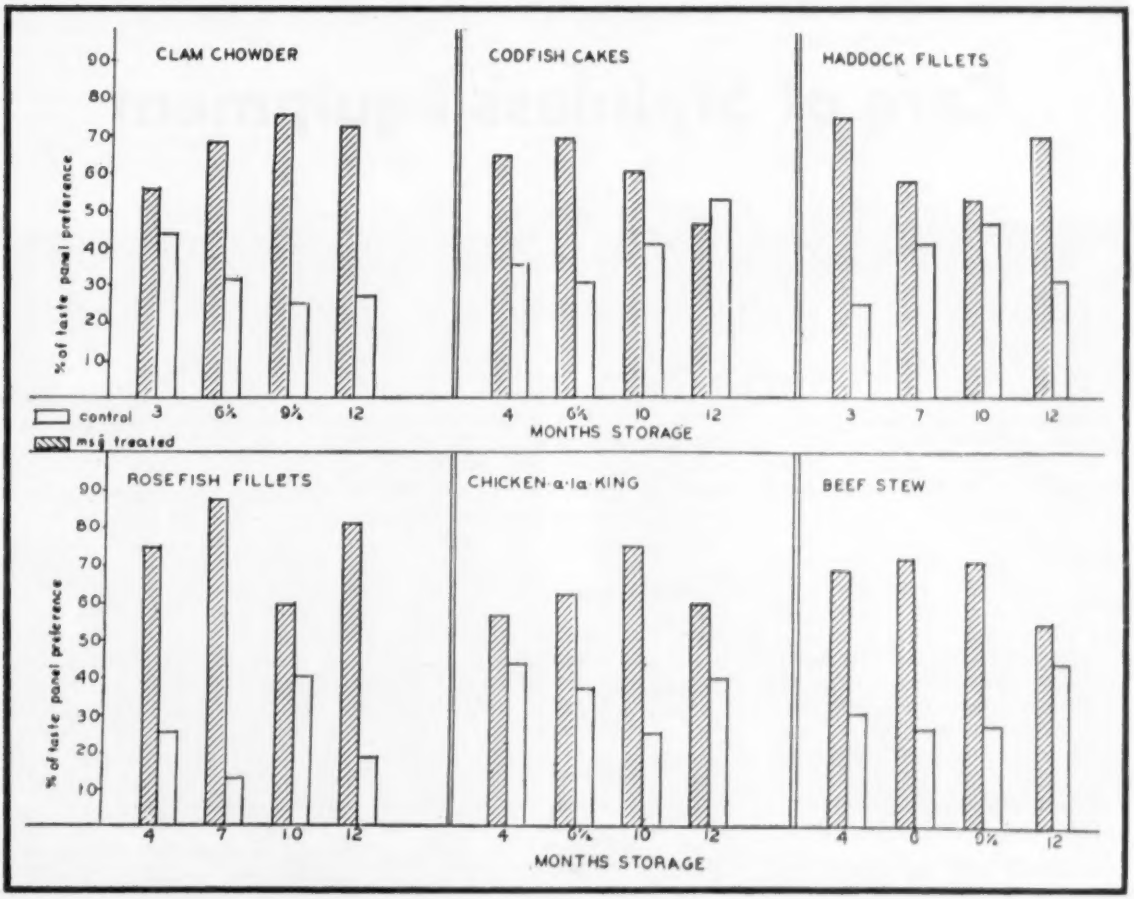
Tests were generally replicated three times for each product at each storage time, with the control sample always appearing in each test series.

Organoleptic Findings

Optimum levels of added MSG (in percent), as determined by palatability scores, were: Clam chowder .125, haddock fillets .20, beef stew .25, chicken-a-la-king .20, rosefish fillets .20, and codfish cakes .20.

(*Turn to page 168*)

High Ratings of Glutamate-Treated Foods Predominate At Different Lengths of Storage



TO REMOVE FOOD DEPOSITS. Left: Ordinary washing of your stainless with mild soap or detergent and bristle brush generally does the job. Right: On stubborn residues, a wire brush or sponge may be used. But only those made of stainless should be employed, since particles of steel that become imbedded in the surface will rust.

Practical Tips On—

Care of Stainless Equipment

Top efficiency of units is attained through well-coordinated sanitation and maintenance program. And a big dividend is higher product quality at lower cost

B. BUCHALTER
Industrial Sanitation Service, Division of Rose Exterminator Co., San Francisco

In stainless steel, you have sanitary and corrosion-resistant food-contact surfaces *to begin with.*

Something else again, however, is the matter of insuring desired extra years of trouble-free performance. But the processor can get this longevity, too. . . .

—provided he observes the rules of sanitation and maintenance specifically set down to stop corrosion from taking hold, keep contaminants from accumulating, and curb growth of microorganisms.

The rules will be spotlighted here.

But first a few prime details on the metals:

Essentially, they are alloys of iron and chromium. With 10% or more of the latter, they provide excellent resistance to corrision and heat. And to develop special characteristics in these alloys is only a matter of adding other elements—principal one being nickel.

Corrosion Mechanism

How chromium gives passivity (inertness) and resistance to oxidizing effects is not definitely known. But it is evident that either an oxide film or a layer is responsible.

It is to be noted that oxygen, which is readily available from the air, favorably affects performance of stainless steels and is usually responsible for its continued success in ordinarily highly corrosive service.

And further addition of nickel to the chromium-iron alloy provides a similar resistance to both oxidizing and reducing solutions, as well as an even more rapid development of passivity.

When stainless steels corrode, it is usually because this passivity has been lost—possibly over only a very small area. As a result, this area becomes anodic to the remaining larger passive surface. So pitting develops.

However, liberal aeration or maintenance of moderate velocities within the specific equipment (such as a container) assists in preventing this pitting by providing an oxygen supply adequate for passivity.

Therefore, if debris of any kind is allowed to accumulate on surfaces of stainless steel equipment, it will re-

duce the accessibility of oxygen to the covered areas. Then, pits may develop in such locations because of reduced oxygen concentration.

Even dust collected on exposed equipment surfaces has been responsible for climinating this protective film.

If equipment is built with crevices or deep recesses, oxygen may not have ready access to the more remote areas, and these may become anodic to remaining exposed areas. This type of corrosion may develop to a very serious extent before it is noticed. Hence the specification of minimum radii in equipment by recently established sanitation standards.

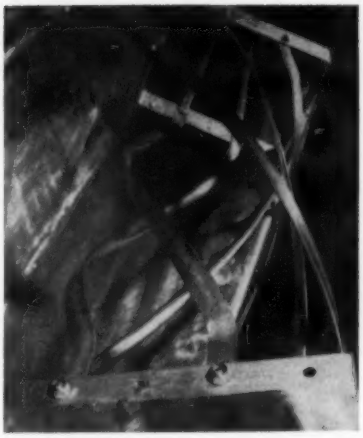
A related fact is that the smoother or more highly polished the surface, the more the resistance to corrosion.

Protective Measures

The pitting type of corrosion is of special interest to the sanitarian because it is in these pits that many microflora find the best incubation conditions, and because it makes cleaning more difficult. In fact, it has been found that microbial life exists *in* the surface of equipment that is provided only with a pickle or No. 2 finish (relatively porous). One large plant specifies that all stainless equipment must have a No. 4 (120 grit) finish or better on all exterior surfaces, as well as on food-contact surfaces.

Now for maintenance details:

First, it is vital that all equipment be thoroughly inspected before it is put into service. Aim is to detect any surface flaws that may have been produced in fabrication.



REPLACING corrosion-inviting nut-and-bolt (foreground) with a stainless fastening (like the ones alongside) increases service life of stainless equipment such as this can twister.

Flaws should be corrected by simple cleaning or polishing where necessary. For example, all welds should be ground smooth and any heat tint removed by polishing.

Next, it is important to protect equipment from contamination. Iron and iron oxides are common casual contaminants. They may be introduced by rust falling from overhead piping or structural members, iron-containing cleaners or polishes, or ordinary steel wool.

Other familiar conditions include: Collection of sediments, sludge, or solid matter in deposits at corners, inlets, drains, valves, etc.; splash spots above the liquid level which may harden; and accumulations of film and grease.

All stainless equipment should be thoroughly cleansed before being put into service, and properly maintained to preserve a clean surface that permits the necessary oxygen contact. Out-of-service equipment should also be cleaned at minimum monthly intervals. With the exception of highly polished surfaces, stainless steel cannot be injured by vigorous scrubbing and frequent polishing.

Furthermore, all deposits are more readily removed when they are fresh and relatively soft—before having a chance to harden. The more frequently the cleaning, the less often will it be necessary to scour or polish to restore the surface.

Proper Cleaning

Ordinarily, washing with mild soaps or synthetic detergents and warm water is sufficient and vigorous scrubbing or brushing usually removes any remaining particles.

Also, any equipment that can be disassembled should be taken down completely when cleaned. Unless specially designed to be cleaned in place, gaskets, joints, and other points of contact between separate parts, are frequent points of corrosion and build-up of microflora.

CONVEYOR links and guides require weekly check. Here, maintenance man polishes transfer plate with special compound that doesn't scratch surface.

TANK is hot-flushed after detergent-sanitizer treatment. Normally, stainless units air-dry, but they should be thoroughly rinsed before use.

Only stainless steel wire brushes or stainless steel sponges are to be used if an ordinary bristle brush is not sufficient. If ordinary steel wool or wire brushes are used, small particules of steel become imbedded in the surface of stainless equipment and rust. This establishes pitting conditions, which are unsightly and possibly contaminate the product as well.

If it is necessary to use stainless steel brushes or sponges, this treatment should be followed by use of a suitable scouring powder or paste. Again it is essential that material used for this is free of iron or its oxides.

Furthermore, there is available commercial scouring powder that does not scratch any stainless finish, being free of contaminants and of sufficiently fine grit (we have used Bon Ami). Other scouring powders will slightly scratch a No. 4 stainless finish (the type known as "polished").

A paste can be made with water and either magnesium oxide or Grade FFF Italian Pumice for use as a polishing compound.

It is important to remember when using stainless-steel wool or one of the above materials that scouring and polishing movements should be in the same direction as the polishing lines, which may be seen in the metal surface.

Another important step is to follow the washing and/or polishing operation with a thorough flushing of clean, warm (or even hot) water. Moreover, there is this vital point: If bacterial contamination must be considered, cleaning operations should be followed by a cold-water rinse to reduce equipment temperature to a level below that suitable for incubation.

This flushing operation is particularly important when cleaning solu-

(*Turn to page 187*)

● ● ●

RADIOACTIVE SCALE accurately weighs bagasse as it flows from crusher. Rays from cobalt source pass through material to Geiger counter, which measures intensity. Amount of absorption is proportional to weight of bagasse.

Geiger Counter "Weighs" Stream of Bagasse

Measures absorption of rays from radioactive source to determine mass of flowing material

Hawaiian Sugar Planters Assn. Experiment Station is using radioactive isotopes to solve some tricky weighing problems.

The problems: (1) To accurately weigh the bagasse (ground stalk) that is left after the juices are extracted from the sugar cane. (2) To weigh the raw sugar itself as it leaves the mill, without slowing down operations.

Until now, there has been no accurate method of weighing bagasse, and this has forced Hawaiian sugar plantations to estimate the total amount of cane milled.

The estimating errors lead, in turn, to errors in studies of production, juice quality, growth, milling efficiency, etc.

The problem has been that the cane arrives at the mill laden with a large amount of soil, rock, dirt and weeds. The whole amount has been weighed.

Later, exact weights are obtained on the juices recovered—but the breakdown of the remaining weight between waste and bagasse has had to be by estimate. This leaves only an estimated total weight of cane.

It has not been practical to measure the soil and trash waste which is washed off and away.

Nor has it been practical up to now to weigh the bagasse which is carried away on a continuously moving conveyor belt. To do so would involve halting the operation.

Less Than 2% Error

The new method, tested for two years in a laboratory model at Ewa Plantation, has proved to have an error of less than 2%.

It involves dropping the bagasse off the conveyor belt for a free fall of a few feet. In its fall, it passes between a piece of radioactive cobalt on one side and a Geiger counter on the other.

The falling bagasse absorbs some of the radioactivity, and the Geiger counter measures this loss through absorption and makes it possible to compute the weight of the bagasse that has passed.

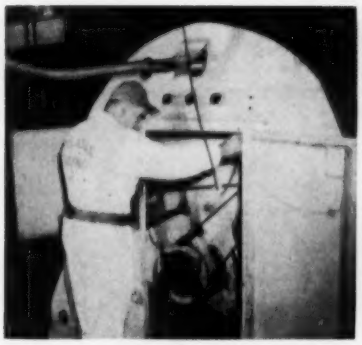
A full-size commercial model is now being put into operation.

Radioactive cesium 137 also was substituted successfully for cobalt 60 as the source of radiation.

The studies now are being extended to a similar weighing of raw brown sugar as it leaves the Hawaiian mills. (It gets its final processing in Crockett, Calif.) At present, the sugar is trucked to dockside bulk storage bins and weighed on delivery there, but the new method would provide a mill check on this weighing.

Dr. Leonard D. Baver, director of the experiment station, says the technique seems to offer the first satisfactory method of weighing bagasse.

There is no single mainland manufacturer of the needed equipment, he said. Parts so far have been bought from a variety of manufacturers and assembled in Hawaii.



LARD is pumped from Reliable's storage tank to 20,000-lb-capacity tank truck.

IN 30 MIN., stainless steel insulated tanker is filled. Truck equipment includes agitator that insures product uniformity. There is also an unloading pump for efficient delivery. Here, truck has arrived at customer's yard.

Bulk Delivery of Shortening Scores *Triple* Saving

Eliminating use of drums, this convenient method (1) speeds handling and processing, (2) cuts labor costs, (3) saves space . . . System outlined, with typical operation cited.

INCREASING bulk deliveries of food ingredients are particularly in tune with today's emphasis on cost-cutting —all along the supply line.

And recognizing this, Reliable Packing Co., Chicago meat house, now provides its lard and shortening to processors the simplified bulk way.

Labor, time, and space advantages of the new system are striking when compared with drum-shipment method:

Handling—Bulk delivery eliminates the expense of filling each drum individually. Also abolished are the time and labor required to load and unload these 380-lb. units from a truck. In contrast, liquid shortening is handled by pump all the way—from maker's storage to truck to user's tank.

Storage—Inside the customer's storage tank, liquid shortening occupies about 25% of the space required to house a comparable number of drums. In fact, the storage tank can be located above the floor, thus permitting all floor areas to be used for other purposes.

Convenience—Eliminated, too, is the time-consuming job of moving drums to the point of use and shoveling out their contents. With the new system, liquid shortening may easily be piped to where it is needed, and in the exact amount required.

For example, with large-volume deep fat fryers solid lard or shortening must be melted in a holding tank, and brought to 385 deg. F. But with the bulk system, it can be piped directly from storage tank to frying kettle and added gradually by a float control. Thus, the kettle is always full and its temperature is uniform.

Now, lets look at a typical bulk delivery—as made to Schulze & Burch Biscuit Co., Chicago.

AT USER'S PLANT, simple hose connection is made to deliver lard at 45 gpm. About 7 man-hours are saved over comparable shipment in drums.

The handling process starts at Reliable's storage tanks, which hold batches of liquid lard or shortening.

Delivery is made in an insulated, stainless steel tank truck. It has a pump, driven by a 3-hp. motor, for feeding lard into user's storage tank, and an agitator that insures product uniformly. This shipment amounts to about 20,000 lb., slightly under the truck's capacity.

At Reliable, a loading pump starts flow of lard into tank truck, and completes the job in less than 30 min. Truck then proceeds to company's weigh station and on to processor.

At the user's plant, the tank truck takes over the unloading task. All that's required is a simple hose connection, then the tanker's pump delivers liquefied lard at the rate of 45 gpm. When handled in bulk, this 20,000-lb. shipment is pumped in less than 1 hr.—with only periodic flow checks made by the driver. But, to unload the same amount of lard in drums would take a driver and three floor men approximately 2 hr.

And since the tanker effects delivery, the user need have only an insulated storage tank with heating coils.

MOZZARELLA balls (½-lb.) are put in plastic bags (right), then air is withdrawn (left). Bags are then sealed, shrunk by steaming to form skin on cheese.

GRATED Parmesan cheese is weigh-filled (right), vacuum-closed (left). High-quality, well-dried cheese, plus exclusion of air, insures color, flavor retention.

Processing Innovations Create Better Cheeses

Improved starter, quicker cure, vacuum packaging bring pluses in flavor, color, shelf life. Consumer acceptance reflected in sales

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

Unwillingness of the president of P. Gambardella & Son Cheese Corp., New Haven, Conn., to accept the status quo of Italian cheesemaking has brought a number of outstanding benefits to the company, specifically—

- **More than double the old shelf life of the company's major product, Mozzarella cheese**
- **Better flavored product, with improved melting characteristics, and**
- **Expansion of the plant's line of Italian cheeses to include Provolone, basket, Ricotta, and grated Parmesan.**

And each of these pluses has paid off handsomely in greater consumer acceptance, as is evidenced by the enormous increase in company sales over the past few years. Present distribution covers all of New England and a major part of the Middle Atlantic states.

How It Happened

It was dissatisfaction with the Mozzarella's keeping quality—a bother to other makers as well to this plant—that caused Company President Manny Gambardella to push aside, as far as possible, conventional making and handling methods. He did not, however, attempt to change the familiar shape in which the product had been marketed for generations.

Following many trials these three basic changes were adopted:

1. Use of a special sweet starter made with 2½%-butterfat homogenized milk. This starter was developed by Mr. Gambardella.

It is slower acting than the starter commonly used for Mozzarella. But it produces a curd that does not require milling. Also, it imparts a pleasing flavor that does not go "off" on ageing. The cheese resulting from this starter has better melting properties than usual in this type of product. And its flavor is superior.

2. A special "quick cure" of the curd after it is formed in ½-lb. balls. This is accomplished by use of a refrigerated brine that deposits a heavier layer of salt on the curd (and in a shorter time) than is possible with brine at room temperature. Used for this step is a stainless cold-wall tank with a directly attached small refrigeration unit.

3. Vacuum packaging in plastic. This eliminates the air that had caused discoloration, and it prevents contamination from handling during storage, transportation, and in display cases at food stores.

With these improvements, the Mozzarella cheese now retains its white color for as long as 90 days without development of off-flavors. Formerly its shelf life ran about 30 days.

Processing Pinpointed

Now for a close look at Gambardell's Mozzarella manufacturing operations:

This is a rennet curd whole milk cheese. The special starter is added to the heated milk, which is then allowed to stand until the curd is formed. This is cut and cooked in the usual manner, and the whey partially drained off.

Wet curd is then transferred to cheesecloth lined frames. When one is filled, ends of the cloth are tied together to make a bag. This is lifted from the frame and placed on a stainless draining table with top sloping to an outlet at one end.

Later the bags are moved to slatted

racks for further draining and ripening of the curd. Finally, they are transferred to a cold room for storage until ready for further processing. Total ageing time is approximately 48 hr.

When properly aged, bags are removed from the cold room, their tops untied, and the curd, now a solid block, is transferred to a stainless kettle mounted on a dolly. Kettle is positioned at the Artofex mixer (Excelsior Engineering Co., New York City) originally developed as a dough mixer for bakeries. Hot water is added, and the mixer started.

As the mixing arms knead the curd in the hot water, it is converted from a crumbly condition to a taffy-like mass characteristic of Mozzarella. When proper consistency is attained, mixer is stopped, kettle is moved away, and the water drained from the curd. Additional hot water is added to keep the curd pliable as it is formed into the ½-lb. balls.

While this is being done another batch of curd is transferred from a bag to a kettle and moved to the mixer for working.

Forming the cheese into balls is still a manual operation. But so skilled are the cheesemakers that the frequently check-weighed portions seldom disclose a discrepancy greater than ¼ oz.

As they are formed, the balls are dropped in a tank containing well water as the first step in cooling the curd. When forming of a batch is completed the balls are transferred to the previously mentioned quick curing tank.

According to Mr. Gambardella, the quick cooling of the curd in the refrigerated brine causes it to shrink and open up pores that quickly absorb the salt from the brine.

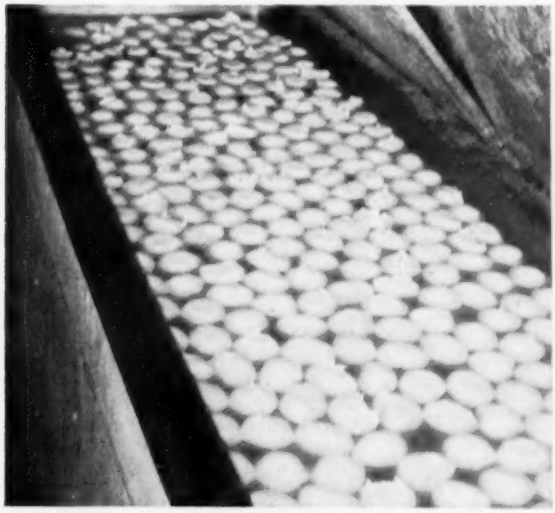
Following a 30-min. cure in the cold brine, balls are removed and transferred to the packaging table. Here they are inserted in printed Cryovac bags, which are immediately

(*Turn to page 235*)

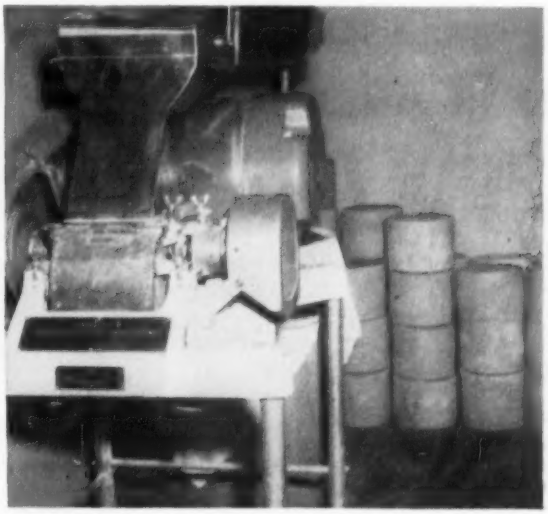
Pertinent Processing Steps—Mozzarella and Parmesan

THE CURD for Mozzarella goes to cheesecloth-lined frames. When filled, cloth is tied, curd allowed to drain.

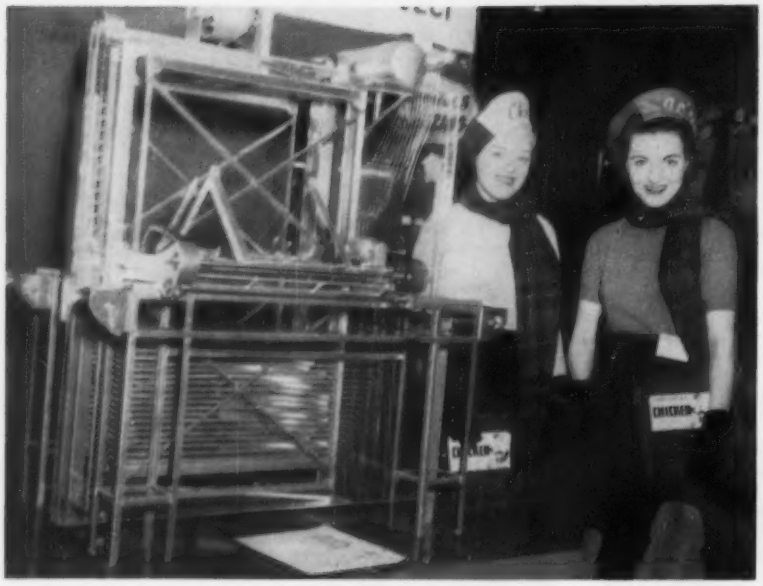
FOLLOWING ageing, curd is placed in kettle of hot water and kneaded to produce taffy-like body.



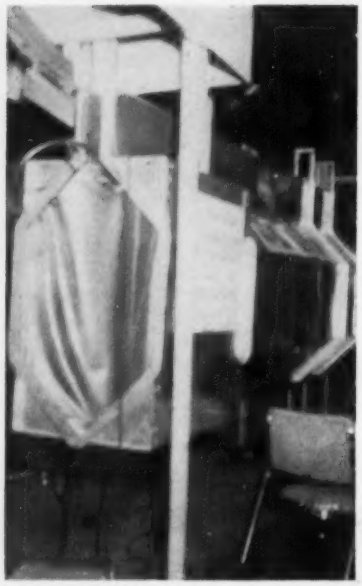
BALLS of cheese get quick cure in refrigerated brine.



GRATING of the Parmesan is done on this comminutor.



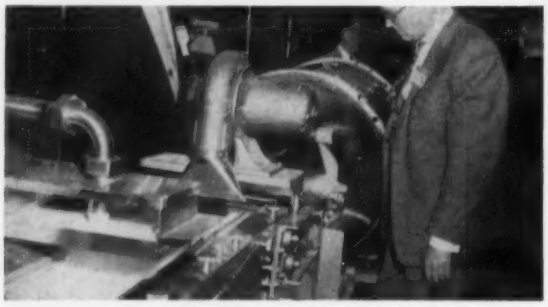
CONTINUOUS 20-station plate freezer for packaged items. Pushbutton loader shoves packages between freezing plates and discharges frozen packages. Counter indexes freezer to next loading station. As last station is filled, elevator lowers plates.—York Corp., York, Pa. (84A)



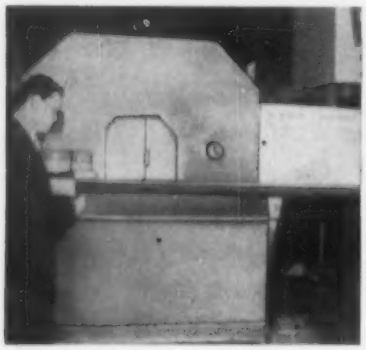
IMMOBILIZING tunnel for conveyor-suspended birds. Vinyl balloon-type air traps seal in CO_2.—Barker Poultry Equipment Co., Ottumwa, Ia. (84B)

New Food Machines At Poultry Show

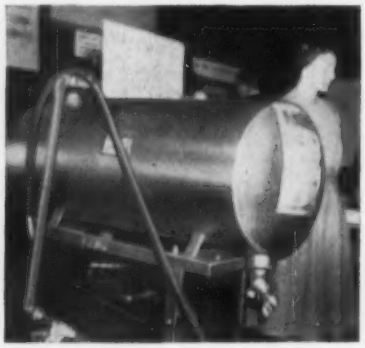
Continuous plate freezer, immobilizer, breader, and chiller exhibited. Also shown: New vacuum extractor, scalder, picker, and packaging units



AUTOMATIC BREADER coats chicken pieces with batter as they are conveyed through curtain of pump-recirculated mix. Product is then covered with breading mix in revolving drum.—Downyflake Breader Mix Div., Doughnut Corp. of America, New York. (84C)



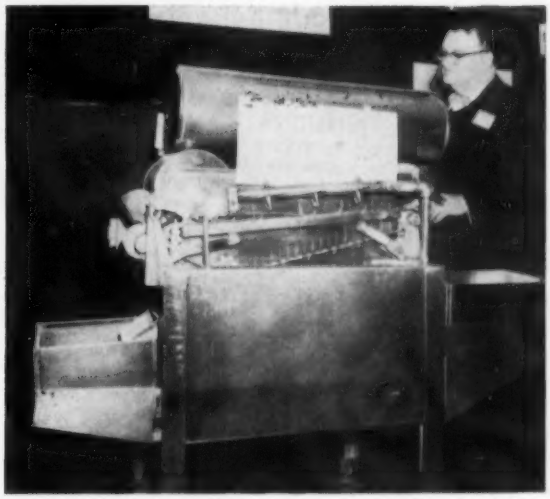
SCALDER exposes birds to strong cross-currents of water. Enclosure conserves heat, holds steam. Handles 20 lb. of chickens or 40 lb. of turkeys in 25 sec.—Barker Poultry Equipment Co., Ottumwa, Iowa. (84D)



VACUUM unit sucks lungs and kidneys from poultry at 1,000-per-hr. rate. Pedal controls vacuum in nozzle inserted into body cavity. Pump creates vacuum in tank.—Kent Industries, Inc., Chicago. (84E)

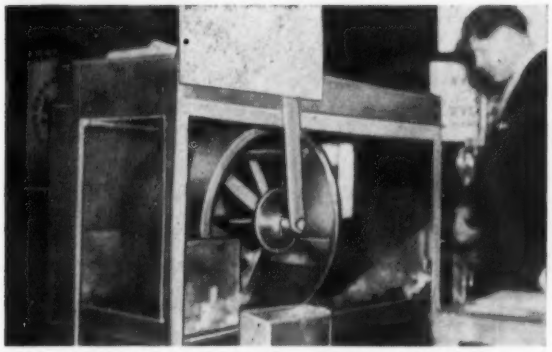
CHILLER has pump to draw water from bottom of tank and distribute it over top, where it runs through ice and over poultry to chill it to 38 deg. F. in 30-45-min.—Gordon Johnson Co., Kansas City, Mo. (84F)

HUGE PICKER handles 60 birds per minute. Spiraling upward against 4x8-ft. rotating drum with rubber fingers, birds make six turns and discharge to conveyor.—Barker Poultry Equipment Co., Ottumwa, Iowa. (85A)



CONTINUOUS SPLITTER and washer handles 2,500 gizzards per hour. Machine is made of stainless steel, with galvanized frame. It has convenient finger-tip adjustment. —Southern Equipment Co., Gainsville, Ga. (85B)

Four Ways to Speed Packaging



CONTINUOUS-SHRINK tank conveys bagged birds under rubber-coated pendulum wheel that submerges them in 80-gal. of 190-F. water to shrink bags.—Hydrahone Equipment Sales Co., Milwaukee. (85C)

PACKAGING of fresh-cut chickens is sped with this setup. Operators pull perforated sheets off roll, wrap tray-packed birds, feed to heat sealer.—Shellmar-Betner Div., Continental Can Co., Mt. Vernon, Ohio. (85D)

MORE INFORMATION

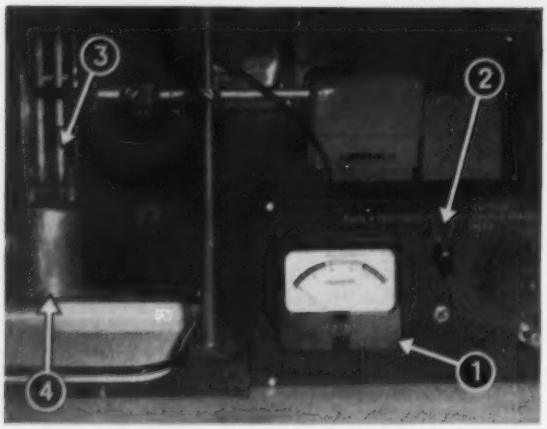
about any item in this article can be easily obtained by circling key number on Reader Service Coupon (inside back cover).

Key number appears at end of each picture caption.—The Editors

STUFFER for packing turkeys (toms or hens) into plastic Mil-O-Film bags is special new adjustable unit.—Mil-Print, Inc., Milwaukee. (85E)

DIP TANK shrinks bags (8-10/min.) in heated glycol solution. Automatic switch dips tray.—Hydrahone Equip. Sales Co., Milwaukee. (85F)

Salt meter components . . .



SIMPLE assembly consists of: (1) Dual-range milliammeter, (2) product-selector knob, (3) platinum electrodes, and (4) sanitary sampling receptacle.

. . . and operation

AS BATCH SAMPLE contacts electrodes, salt content registers on ammeter dial. Tolerance range is shown between blacked-out portions of dial.

Unique Salt Tester

Simplifies Quality Control

Device enables Gerber to gage salinity of soups, vegetables, custards right on line in mere half minute . . . Equipment detailed . . . Method seen applicable to other products

LUIS DE ALCUAZ

Laboratory Manager, Gerber Products Co., Oakland, Calif.

Checking of batches of soups, vegetables, and custards for proper salt level was a laboratory function at Gerber's—until a way was found to put this critical control procedure right on the production line.

Today, an inexpesive salt meter eliminates the former time-consuming titrations and organoleptic techniques. It operates on a conductivity principle to detect salt concentrations down to 0.05% with a precision of 0.05%.

Very important, too, is the fact that this simple 30-sec. determination is made by production personnel at a time when batch adjustment is easy.

Furthermore, the method is applicable to a wide variety of food products.

In this equipment, the food sample acts as an electrolyte in a conductivity cell. Basic principle of the unit, which was developed by J. Savelli and his co-workers in the company's quality control laboratory at Oakland, Calif., is that electrical conductance of a salt solution is, for all practical purposes, proportional to its ionic concentration. And since conductance is the reciprocal of resistance, current flow is related to applied voltage by Ohm's law.

However, to eliminate the variation of conductance with temperature, the equipment is calibrated for readings at a single convenient temperature.

As shown in our first photo, the apparatus comprises: (1) Dual-range milliammeter, (2) product selector knob, (3) platinum electrodes set in a plastic block, and (4) stainless steel sampling cup. Flexibility of the salt tester is increased by the selector knob, which adjusts the ammeter resistor to cover the required range of conductivities (salt contents).

The instrument is calibrated so that acceptability limits for all products tested are within the center portion of the ammeter scale. Two marks on the scale set this range, and for quick reading, the rest of the scale is blacked out. Since the instrument range is automatically set by the selector knob, no adjustment can be made on the scale. Thus, the readings are tamperproof.

How It's Used

In operation, the batch is heated to a predetermined temperature and the selector knob is set for the particular product to be tested. Then the operator draws a homogeneous sample with the sanitary receptacle and lifts it so that the contents contact the electrodes of the salt meter. Simultaneously, a reading is indicated on the ammeter scale.

If the reading registers at any point between the two scale markings, the salt level is within the desired tolerance limits. And a reading outside of this range indicates that the batch is to be rejected. Actually, the operator does not read the scale but merely notes the position of the needle.

Tolerance range for each product is determined by a careful study of samples prepared at different salt levels, and necessarily it varies with different products. But the instrument is sufficiently versatile to handle a wide range of salt concentrations.

It must, of course, be calibrated to insure that tolerance limits of all products tested fall within the equipment's range.

Equipment Details

Power for the salt tester is 110v. a.c., with a radio filament transformer reducing the output to 2.5v. Alternating current and low voltage are

(*Turn to page 203*)

Rosy Future for Frozen Foods Keyed to Heat-Eat Items

Prepared products out-pace others in overall 10% gain for year —are expected to take lead. With their rise come new problems. Packers get helpful tips on operations and technology at meeting

FE STAFF

Frozen food packers—over 2,500 strong—tackled problems on research, production, transportation, and warehouse storage at the National Frozen Food Convention held last month in Chicago.

Bullish trends attest to why this was the biggest and liveliest frozen food convention ever held. For in 1954, frozen food sales soared to a record retail value of $1¼ billions—a 10% gain over 1953.

Practically all frozen foods shared in last year's gain. But flashiest performers were the prepared heat-and-eat items.

Fish sticks might be singled out as an example of how fast these convenience items are catching on. From a 1953-standing start, when only 7½ million pounds was put up, packers went on to turn out 50.1 million pounds in 1954.

Of the leading prepared item, main-course pot pies, more than 100 million pounds was packed last year. Production of frozen fruit pies, the dark horse that is rapidly coming up, was about 35 million. And cooked-potato output—in French-fried and other forms—totaled more than 80 million.

See Precooked Taking Lead

Although surpassed in sales by most of the older established frozen foods, few packers expect heat-and-eat items to remain long in this subordinate position. Convincing proof is how this field has been eyed by the "big names."

Campbell Soup stuck one toe in the water last spring when it began test marketing a line of frozen soups in the Philadelphia area. Now it's got its whole foot in by expanding this line on a national basis. Quaker Oats may soon have out a frozen heat-and-eat Aunt Jemima pancake. And two Chicago meat packers, intrigued by success of complete dinners, soon may enter this field.

Talk was floating around the convention about frozen concentrated milk appearing on the market within 5 years.

But Other Items Will Gain

Further gains may be expected in production of established frozen fruits, juices, vegetables, poultry, and seafoods, but at a rate below that of prepared foods. For instance, it is estimated that 20% of the poultry is marketed frozen, and the same amount of seafoods.

More startling are some of the figures for some frozen fruits and vegetables: 60% of the lima bean crop, 45% of the broccoli, 32% of the spinach, 45% of the orange, and 45% of the strawberry.

Despite the rosy outlook on the sales front, frozen food packers are confronted with many problems that have been thrashed out at the convention.

Better Accounting Needed

Recognized is the need of cost accounting for both packer and distributor by the National Assn. of Frozen Food Packers and National Wholesale Frozen Food Distributors Assn. The packer's association has prepared a detailed manual describing a recommended cost accounting system. It will enable packers to recognize their production costs and thus encourage logical pricing policies. Too, by compiling area and industry averages, a packer using this accounting system can compare his costs with area and industry averages.

Such comparisons spotlight uneconomical phases of operations and lead to improvements.

More Opportunities and Problems

Packers will be taking on more responsibilities when preparing frozen precooked, preseasoned, prepackaged, and ready-to-serve foods (with or without heating) than when making individual items, according to J. G. Woodroof, Georgia Experiment Station.

Advantages of freezing such foods are extensive, and the operation is far more complex than with uncooked foods. For example, chickens frozen raw may be either whole or cut-up. But, if fully prepared, without removing the bones, they may be fried, baked, barbecued, roasted, or fricasseed.

If fully prepared, after deboning, meat chunks can be used to prepare creamed chicken, salads, sandwiches, pies, a la king and a la Newburg items, chow mein, chicken and chestnut salad, dumplings, chicken and rice, chicken noodles, patties, tamales, and many other specialties.

In addition, chicken meat may be ground to make Brunswick stew, spreads, sticks, croquettes, soup, and meat and vegetable combinations. Or the deboned meat may be congealed and sliced for cold plates, salads, sandwiches, and hors d'oeuvres.

Even byproducts—fat, gelatin, seasoning paste, concentrated broth, and concentrated soup—may be prepared.

Opportunities in freezing prepared foods are further illustrated with chicken, which has at least six parts with different color and flavor characteristics. Parts have dark or light meat, bony or non-bony pieces, and fatty or lean portions. Some are highly and others are mildly flavored. Some have a large amount of gelatin, and most portions yield flavorsome broth or juice.

Real problem in freezing prepared foods is retaining a balanced flavor. This is illustrated in sausage, barbecued meat, stuffed turkeys, or cured meats. In most cases, there are not a few, but many flavors which must be added and kept in balance throughout freezing, storage, and consumer preparation.

Stability of flavors varies widely, which is in sharp contrast to freezing raw, unseasoned foods. If the flavor

of the latter gets slightly "off", it frequently can be corrected during cooking or by adding more seasoning. But if the flavor of frozen prepared foods changes, little can be done.

Possibly one of the biggest responsibilities of those freezing prepared foods, Dr. Woodroof concluded, is selection of the foods. While many prepared dishes have an acceptable local, fresh market, they may not be successful when frozen and distributed nationally. Therefore, keen judgment is essential to determine formulas for precooked frozen foods. This was emphasized with barbecued chicken, which some people preferred mildly seasoned and others very hot.

Fast, Automatic Handling

W. R. Green, Rapid Standards Co., pointed out that the application of live racks to storing and selecting frozen foods will make radical difference in the rate of order selection. For example, a leading cookie manufacturer has installed a number of conveyor-rack systems in its distributing warehouse. And it is possible to manually select from a rack at the remarkable rate of 900 cases per hour. It is practical to expect that these goods can be stacked in trucks at this same rate by one man—and that it is but a one-man job to keep the rack loaded.

For many months Rapid Standards has been experimenting with automatic loading and unloading devices to be used in conjunction with live racks. In fact, an experimental setup in one plant automatically selected a wide variety of cased goods.

In addition, the company has been working with a number of the leaders in the field of automatic selection and electronic control. And the hope is that it eventually will be practical to receive goods from a car or truck, deposit them automatically into a rack and select them automatically through the use of a punch card inserted into a selector.

However, automatic loading and unloading may not be justified in all areas.

Freezer Space Increasing

About 10 million cubic feet of freezer space is being added each year, keeping pace with the steadily increasing production of frozen foods, according to M. W. Young, president of the National Assn. of Refrigerated Warehouses.

Easily in sight in 1955 is 275 million cubic feet of freezer space. And along with this increase has come cost-cutting operational techniques, more efficient materials-handling methods, and better control of temperatures and humidity—all important to the frozen food field.

Better Warehousing Urged

John Fox, president of Minute Maid Corp., voiced his opinion of what packers and warehousemen should expect of each other.

First, the packer wants proper protection of his merchandise to maintain quality until it reaches the consumer.

Important, too, is the movement of inventory on a first-in-first-out basis. Products have been kept in storage several years, with the records indicating that they had been released long ago. And the quantity of such cases is unbelievably large.

There is a somewhat similar problem in handling impounded merchandise, according to Mr. Fox. Required is an impounding procedure whereby poor-quality merchandise must be withheld from shipment until the packer's quality control personnel appraise it carefully—and in many cases ship it back to the plant for disposition.

At Minute Maid, it costs between $2 and $3 to obtain a new customer. That customer can be lost, never to be regained, if he or she gets a poor can of juice. A mistake of shipping ten cases of impounded juice could amount to 500 customers lost forever, or an out-of-pocket cost to Minute Maid of between $1,000 and $1,500, and this on a mere 10 cases.

Mr. Fox also urged warehousemen to constantly search for the latest developments in refrigeration and materials handling equipment so that their costs can be reduced. Every well-run frozen food company is going to be more concerned from here on out about the cost of storage.

The packer hopes that the warehouseman will continue to expand and keep his building program in line with the needs and demands of the packer's operation, Mr. Fox stated. With the exception of a few tight sections in the country, the warehousemen were credited with an exemplary job in this respect.

Five Pointers for Packers

As to what the warehousemen expect of the packer, Mr. Fox made these observations:

1. He deserves a fair return for the services he renders and prompt payment of bills.

2. He should receive complete advanced information on incoming and outgoing movements of packer's stock. He should not be surprised with a crisis a week and made to turn his organization on its ear in order to accomodate the poor planning of the packer's traffic department.

3. The packer should make every effort to package his product in sizes, cartons, and weights for efficient and easy handling.

4. The warehousemen should expect fair payment for extra services, such as inventory-taking, separation of codes, double and sometimes triple handling of goods, etc.

5. Finally, the warehouseman and his help are due all the normal courtesies from the packer.

Retail and Haulage Problems

Packers discussed another serious situation — inadequate amount of equipment for storing and displaying the ever-increasing volume of frozen foods in retail stores. This unhappy situation continues despite the large amount of new equipment being installed.

Transportation presents another continuing problem. At present there is a shortage of suitable equipment—rail and motor carrier. Some motor carriers are well equipped. But in many cases trailers fall short of furnishing adequate product protection.

Fundamental objective is to maintain line haul rates on frozen foods in balance with rates on competitive items. Aside from haul rates, rail carriers are seeking a 31% increase in refrigeration charges, which the packers won't go for.

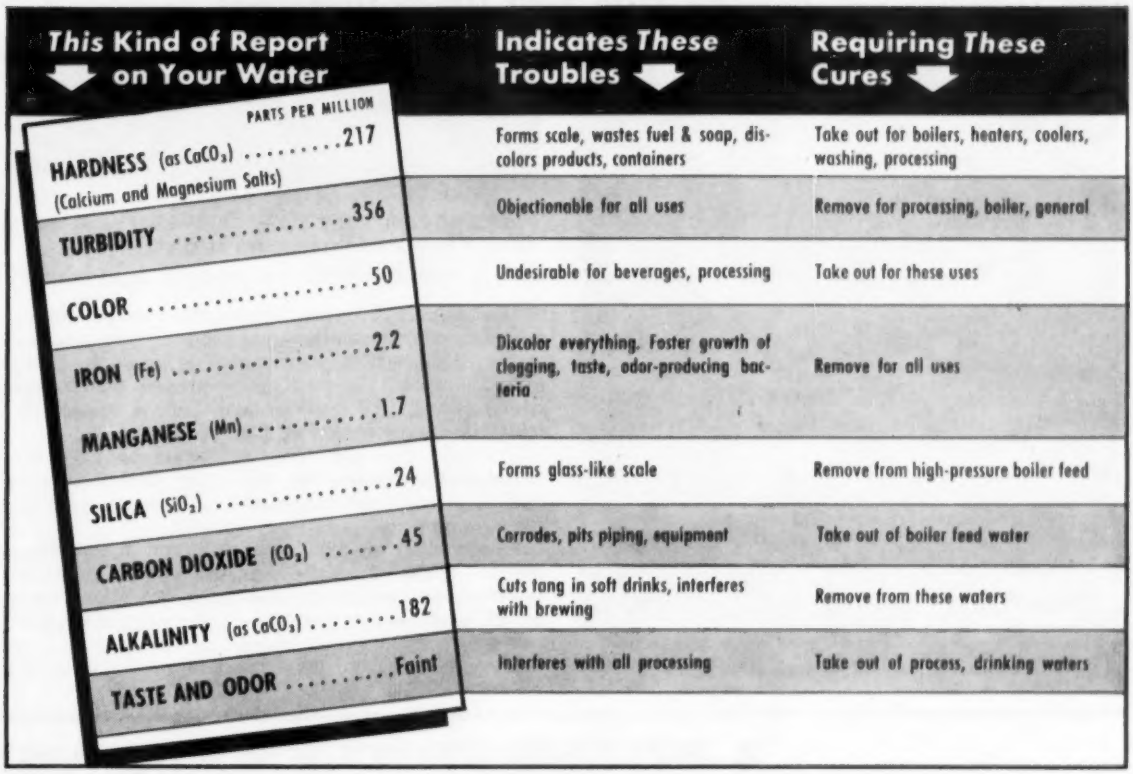
Improving Product Quality

At a research session, D. K. Tressler, Quartermaster Food & Container Institute for the Armed Forces, pointed out that serious consideration should be given to improving blanching and movement of vegetables in processing to curb losses of water-soluble compounds. Also important are studies on losses in glutamate content of vegetables during processing, and optimum MSG additions to produce products with superior flavor.

H. L. Hansen, USDA, stressed the three key problems confronting processors of prepared, precooked foods. They include: preserving flavor, maintaining texture and consistency, and watching bacteria.

Off-flavor is a more serious problem than with non-cooked, frozen foods. For example, cooked turkey items tend to become rancid. Solution is to cook turkey along with an antioxidant, and add an antioxidant to sauces and gravies.

(*Turn to page 188*)


This Kind of Report on Your Water
Indicates These Troubles
Requiring These Cures
PARTS PER MILLION
HARDNESS (as $CaCO_3$) (Calcium and Magnesium Salts) 217
TURBIDITY 356
COLOR 50
IRON (Fe) 2.2
MANGANESE (Mn).....1.7
SILICA (SiO_2) 24
CARBON DIOXIDE (CO_2) 45
ALKALINITY (as $CaCO_3$) 182
TASTE AND ODOR .....Faint
Forms scale, wastes fuel & soap, discolors products, containers
Take out for boilers, heaters, coolers, washing, processing
Objectionable for all uses
Remove for processing, boiler, general
Undesirable for beverages, processing
Take out for these uses
Discolor everything. Foster growth of clogging, taste, odor-producing bacteria
Remove for all uses
Forms glass-like scale
Remove from high-pressure boiler feed
Corrodes, pits piping, equipment
Take out of boiler feed water
Cuts tang in soft drinks, interferes with brewing
Remove from these waters
Interferes with all processing
Take out of process, drinking waters

WATER TREATMENT

Is a 'Must' in the Modern Food Plant

★ Remove hardness—and you stop the scale troubles, save on detergents, abolish unsightly deposits on products, containers

★ Remove color, turbidity, organisms, odors, gases—and you have water sparkling-ready for optimum processing operations

ESKEL NORDELL

Director of Technical Information, The Permutit Co., New York City

TREMENDOUS AMOUNTS of water are employed in the food industry for a variety of purposes—such as processing, cooling, boiler feed, and many general operations. The latter include flushing, rinsing, laundering of uniforms, towels, etc., and routine sanitary uses.

Your supply may be a private one, or it may be that of a municipality. Primary source may be ground water from wells or springs, or surface water from a lake, pond, reservoir, or flowing stream.

In either case, it contains various impurities which, when present in objectionable amounts, should be removed or reduced to allowable quantities by proper treatment.

If the water is obtained from a municipality, it may be considered above suspicion as far as drinking purposes are concerned. This, however, is no guarantee that it is suitable—as is—for all other purposes.

A SPECIAL FE ENGINEERING REPORT

How Hardness Can Interfere With Your Utility Operations

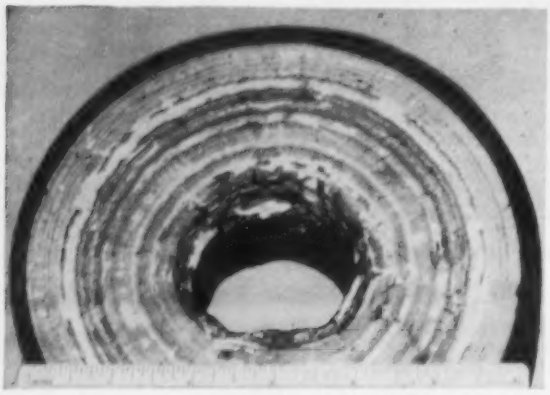


FIG. 1. SIX INCH hot water pipe choked to 2 in. effective opening by scale deposited from hard water.

FIG. 2. BOILER TUBE "bagged" as result of poor heat transfer from scale deposit seen at (right).

It probably contains hardness in a greater or lesser degree. For practically all natural water supplies are hard, no matter what they are called.*

* The so-called natural soft waters are simply ones that are rather low in hardness, ranging from slightly less than 1 grain per gallon to over 5 grains. Municipally softened waters are seldom zero in hardness. Instead, most range from 3 to 7 gr per gal. in hardness and average from 4 to 5 (1 gr. per gal. is 17 ppm. so a 5-gr.-hardness water contains 85 ppm.)

Most municipal water is quite clear and colorless but many become temporarily turbid following periods of heavy draws. Many such supplies develop, at times, disagreeable tastes and odors. Therefore, numerous food plants employ clarifying units and taste-and-odor removal equipment as insurance against these "off periods".

Of course, there are other constituents that may be objectionable for certain uses—those that cause too high an alkaline or iron content, an odor of hydrogen sulfide, or corrosive property.

Private water supplies may be drawn from wells or springs. These are usually clear, colorless (or nearly so), and free from (or low in) microorganisms. Also, they are usually very even in temperature throughout the entire year.

Their mineral content is almost invariably higher than

4 END-USES OF YOUR WATER AND

You will note that there are four food-industry uses for water—(1) *Process;* (2) *Cooling;* (3) *Boilers,* and (4) *General.*

As requirements vary, specific treatments must be employed. As evidence, seven methods are considered here, and all are used to handle different water supplies and to meet different requirements (see Table IV).

1. Process waters. There are various impurities that would be objectionable in any process water. If a water is muddy, or smelly, or highly colored, or contaminated with microorganisms, or if, due to its content of iron or manganese, it stains everything it contacts, it is obvious that the offending impurities must be removed.

But suppose the water is free from them. Or that, if it had contained one or more of them, they had been removed by treating. Is it then suitable for use as a process water?

That question can't be answered unless we know in what particular process it's to be used and what other impurities it contains.

If it's a hard water (appreciable amount of bicarbonate alkalinity), it might be suitable, as is, for bread making. Or for brewing a dark beer. It would not, however, be good for making light, Pilsener-type beer. Nor for soft drinks in which the alkalinity would kill a lot of the tang in the syrup.

Such a water would also be unsatisfactory for washing citrus fruits, for preparing vegetables for canning, for processing cans, jars, or bottles, and for all cleaning purposes where alkaline detergents are employed.

Therefore, further treatment of the water would be in order, depending not only on its composition, but also on its end-use.

Brewing-water for a light beer might require not only a reduction of alkalinity by the cold lime process but also *an increase in the calcium-sulfate hardness.* In the same brewery, water for boilers, bottle washing, pasteurizing, and general cleansing would need complete softening, usually with a sodium-cation exchanger (zeolite) unit.

The soft drink bottling plant, using the same water, would also employ the cold lime process for reducing its alkalinity for syrup making. But it *would not add calcium sulfate.* It would probably use the zeolite softener for the boiler, the bottle washer, and general cleansing.

The cannery most probably would use the sodium-cation exchanger (zeolite) to soften *all* the water. The same in most dairies and many other food fields.

2. Cooling Waters: Color, tastes, and odors wouldn't usually affect cooling waters. But microorganisms, also metals that foster growth of iron and manganese bacteria, might be very objectionable, since organic growths can cut heat transfer and seriously clog cooling systems.

As for hardness, bicarbonate is most undesirable because it forms scale. But tolerances for it depend on amounts present, temperatures reached, and whether the system is a once-through-and-to-waste or a recirculating arrangement and, if the latter, whether it is an open or closed system.

In addition to removing mud, iron, manganese, or microorganisms, the water might be treated to reduce carbonate hardness by the cold lime process (or partial neutralization with acid, or treatment with hexametaphosphate). Or it might be completely softened with a sodium-cation exchanger (zeolite) unit.

3. Boiler Waters: Mud, of course, is objectionable here. Color may or may not be. Odors and organic matter certainly would be undesirable where open steam is used in processing.

Iron and manganese would be objectionable. As for soluble solids, hardness in any form is highly undesirable due to its scale-forming. Also dissolved gases—particularly oxygen (from dissolved air) and free CO_2—due to their corrosive properties. They should be removed from the feedwater before it enters the boiler.

that of surface waters in the same area. They may contain iron and/or manganese in solution and possibly H_2S.

If the private supply is drawn from a lake, pond, reservoir, river or other surface source, then, in addition to its mineral content, it may be turbid, colored, or contain organic matter, organic iron or manganese, various microorganisms, and have undesirable tastes and odors.

And so, as with ground waters, surface waters may need clarification, sterilization, and taste and odor removal.

Numerous Types of Impurities

Sediment and Turbidity: Suspended insolubles that are coarse enough to settle out rapidly are termed sediment. And very finely divided matter tending to remain in suspension brings turbidity.

In flowing streams, the latter may vary so much from time to time that the maximum may be several hundred times the minimum (as shown in Table I). In lakes, ponds, and reservoirs, the water may be clear most of the time. But storms, temperature changes (spring and fall overturnings), and currents may cause great increases in turbidities (Table II).

Waters with appreciable sediment and turbidity are undesirable for practically all uses, but tolerances vary somewhat according to the end-use and nature of the insolubles. For most uses, though, insolubles should not exceed 5 ppm., and for special uses 2 ppm.

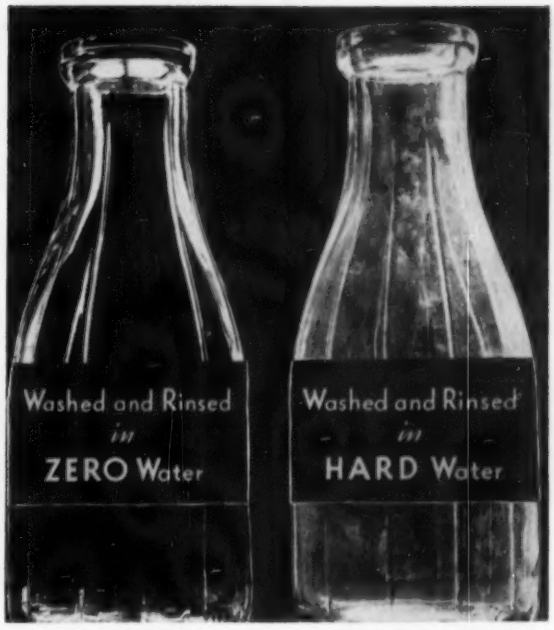


FIG. 3. PROOF that treatment pays (unretouched).

THE 'REQUISITE' TAILORING STEPS

Treatment depends on size of boilers, on operating pressure, and on whether or not open steam is used in processing. Here the sodium-cation exchanger (zeolite) is widely used, as are also the processes employing the hydrogen-cation exchanger, hot lime soda, and cold lime plus the sodium-cation exchanger.

4. General-Purpose Water, since it is used for drinking, washing, and other cleansing and rinsing operations, should be clear and colorless, preferably soft, and free from tastes, odors, iron, manganese, and harmful bacteria. Treatment is frequently that used for all of the plant water.

If the water needs clarification, or iron or manganese removal, one central plant may be used for this purpose and additional treatments applied for different uses.

Where a clear, clean, colorless, potable, iron- and manganese-free water is available, then the central plant may be a sodium-cation exchanger.

How One Plant Solved Its Hard-Water Problem

An example of action against hard water is offered at a specific large dairy handling 3,000 cans of milk per day. Its experience is applicable to many other food plants having hard-water supplies.

Each day, this dairy softens and chlorinates 300,000 gal. of water, of which between 125,000 and 150,000 gal. are heated. Before water softeners were installed, there was a very serious problem here due to scale formation in the water heaters, hot water lines, bottle washers, pasteurizers, and steam boilers (3-150 hp. operating at 150 psig.). The raw well water had a hardness of 15 gr./gal. (257 ppm.).

Removing the scale—even where it was accessible—proved to be a constant, unpleasant, and unrewarding job. For, as the old scale was cleaned out, new scale started to form.

The plant resorted to chipping, turbining, and application of muriatic acid. But the cleaning was very unsatisfactory. And there was repeated replacement of valves, piping, nozzles, and fixtures. In fact, the engineer claimed he could have retired on what he spent for valve renewals alone.

Turbining of the boilers was frequent and, at each cleaning, wheelbarrow loads of scale and sludge were removed.

In the bottle washer, the caustic soda reacted with the hardness-causing material and precipitated calcium carbonate and magnesium hydroxide. These gummed up the nozzles, formed deposits in the washers and recirculating systems, and left the bottles with unsightly films that weren't removed in subsequent rinsing and cooling operations. So, though the bottles were sterile, they presented a very unclean appearance.

Since installation of a double-unit sodium-cation exchanger (zeolite) water-softening plant, all of these troubles have disappeared.

In the boilers, scale and sludge deposits have vanished with no boiler compound required. Fuel is used more efficiently. And turbining is no longer necessary.

In the water heaters, hot water piping, and pasteurizers, the old scale formation has ceased and the periodic cleanings by chipping and muriatic acid are now a thing of the past. Moreover, valve and piping renewals have shrunk to a minimum.

Cleaning throughout the plant is now incomparably better and is accomplished much more easily.

In the bottle washers, the spray nozzles and recirculation system never clog. The bottles now come out of the washers clean, bright, and sparkling, without a trace of the former unsightly films

While detailed figures as to savings are not available, the owners find their water softening plant indispensable. "The benefits," they say, "bulk very large, proving this plant was an excellent investment."

Sodium-Cation Process Removes Calcium and Magnesium Hardness

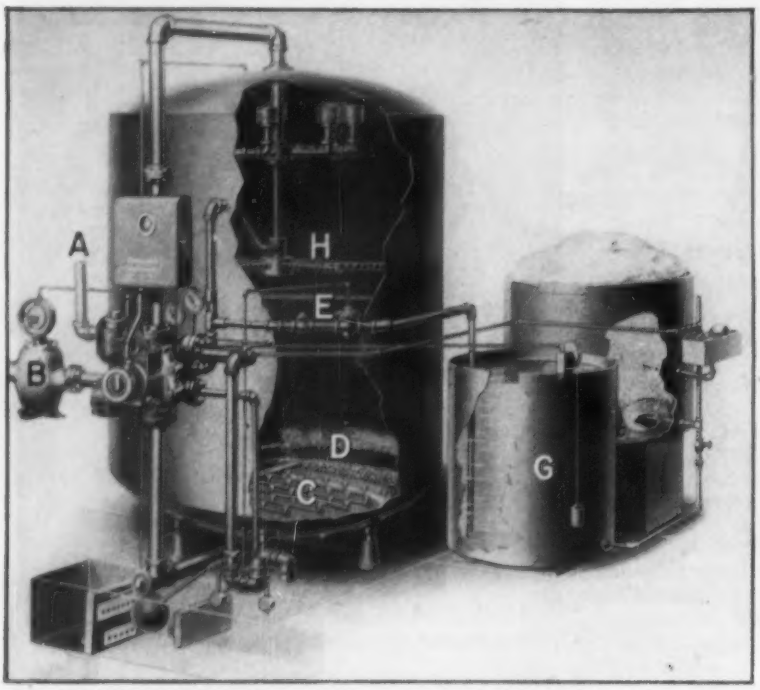


FIG. 4. IN ZEOLITE (sodium cation exchanger), hard water enters at (A), softened water discharges through meter (B). For regeneration, untreated water from distributor (C) rises through gravel (D), zeolite (E), leaves by collector (F), brine, measured in tank (G) is fed from distributor (H).

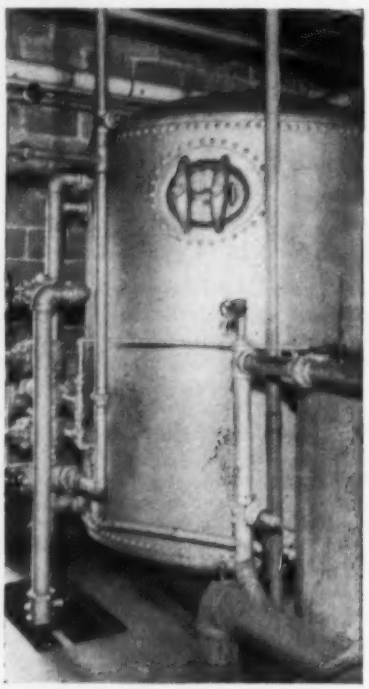


FIG. 5. SOFTENER in cannery. Here, hard water lowers quality of fruits, vegetables, forms unsightly film on containers.

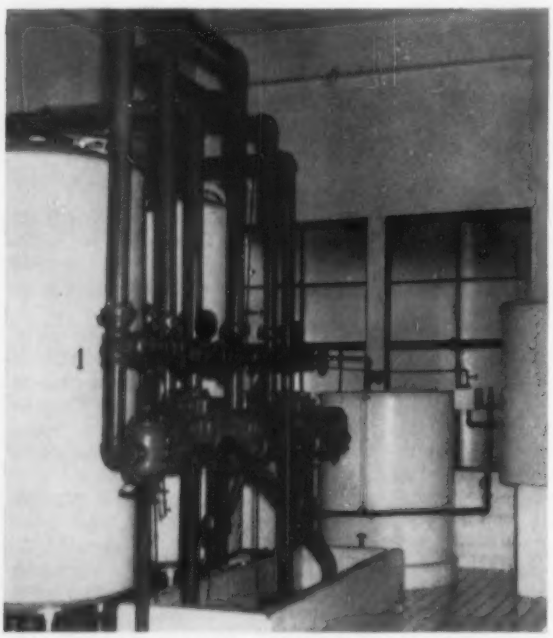


FIG. 6. DOUBLE UNIT in brewery softens water for boilers, bottle washers, pasteurizers, general cleaning.

Color and Organic Matter: Color in water is usually due to organic material leached from decaying vegetable matter. Surface waters having high color generally originate in swampy areas. Some shallow well waters and, though very rarely, deep well waters have high colors. These are usually caused by peat beds through which the waters have seeped (see Table III for maximum and minimum colors in a group of 20 surface waters over a 1-yr. period).

Below 10 ppm., coloring matter usually is not noticeable in a tumblerful, but 20 ppm. are. Hence, waters having the latter amount, or more, would be considered high in color and undesirable for most uses. Tolerances generally should not exceed 10 ppm., and for special uses 5 ppm.

Microorganisms: While generally absent or low in number in deep well waters, microorganisms are common in surface waters and, while most are nonpathogenic, pathogenic ones may also be present.

Among the former are crenothrix, slimes, algae, beggiatoa, and others which may cause serious clogging troubles and objectionable tastes and odors.

Tastes and Odors: Ground waters, except for the sulfur waters, are usually free from tastes and odors. Stagnant surface waters containing microorganisms and decomposed organic matter, and waters contaminated by trade wastes, may develop very objectionable tastes and odors. Such waters, of course, are unsuitable for use in the food industry and therefore require treatment.

Hardness is due to the soluble salts of calcium and magnesium and in the U.S. is expressed as the equivalent amount of calcium carbonate ($CaCO_3$) in terms of either gr./gal. or ppm. Most natural water supplies will have hardnesses ranging from 1 to 25 gr./gal. (17-428 ppm.), some will range from this to 50 gr./gal. (857 ppm.), and a very few may run up to double this figure.

While hardness content of water from any given deep well or spring usually shows but slight variations, even over periods of many years, that of flowing streams is subject to considerable variations (as noted in Table I). Large lakes, ponds, and reservoirs are usually quite constant in

composition, whereas small ones may show appreciable seasonal variations.

In the food industry, hard waters form solid, adherent scales in water heaters, hot water piping and fixtures, washers, recirculation equipment, pasteurizers, steam boilers, and other places where they are warmed, boiled, or evaporated (Fig. 1).

Since scales have thermal conductivities about the same as firebrick, their formation leads to inefficient heat transfer. And with direct-fired vessels, this can cause overheating, bagging, and eventual failure of the metal (Fig 2). Hard waters also form unsightly films and deposits on containers during processing or pasteurization.

Blanching and processing in hard water lowers quality of many canned vegetables. Peas, beans, and lentils become tough and unpalatable. Beets acquire whitish deposits. Asparagus buds tend to open out. And cream corn toughens. In washing fruits, such as citrus, in hard water, a clean, bright and inviting skin cannot be obtained, and much detergent is wasted.

Specifically, each gr./gal. of hardness wastes 1½ lb. of soap for each 1,000 gal. of water. In addition, an equivalent amount of sticky, insoluble lime and magnesia soap curds form. These tend to adhere to everything they come in contact with. They cause the well known "tattletale gray," yellowing, rancid odors, harsh feel, and decreased life of laundered uniforms and towels. Also, they stick to scoured tables and floors, forming unsanitary, dirt- and bacteria-gathering deposits.

Hard waters also react with caustic soda to build up clogging deposits in bottle washers and their recirculating system, and they leave filmy, whitish deposits on bottles, often necessitating extra polishing (Fig. 3).

Alkalinity of a water supply is usually due to bicarbon-

Tables Pin-Point Water Characteristics and Treating Methods

TABLE I—VARIATIONS Over a Year's Time in Turbidity and Hardness of Waters of Rivers (20 Checked)

Name of River	Sampled At or Near	Turbidities (Ppm.) Maximum	Turbidities (Ppm.) Minimum	Hardness (Ppm. as $CaCO_3$) Maximum	Hardness (Ppm. as $CaCO_3$) Minimum
Alabama	Selma, Ala.	325	25	67	28
Allegheny	Kittanning, Pa.	65	2	90	26
Cahaba	Birmingham, Ala.	265	5	74	21
Chattahoochie	West Point, Ga.	450	15	27	5
Cumberland	Nashville, Tenn.	425	28	102	65
Delaware	Lambertville, N. J.	90	1	61	24
Grand	Grand Rapids, Mich.	375	3	268	164
Hudson	Hudson, N. Y.	39	4	89	45
Illinois	LaSalle, Ill.	1610	10	277	157
James	Richmond, Va.	400	6	71	26
Lehigh	So. Bethlehem, Pa.	50	1	105	26
Missouri	Kansas City, Kan.	5350	35	348	159
Monongahela	Elizabeth, Pa.	350	9	57	26
Oostanula	Rome, Ga.	415	4	118	27
Peedee	Peedee, S. C.	375	15	33	17
Potomac	Cumberland, Md.	280	3	148	41
Raritan	Bound Brook, N. J.	272	4	55	29
Wabash	Logansport, Ind.	900	5	637	169
Wateree	Camden, S. C.	960	10	38	14
Youghiogeny	McKeesport, Pa.	1600	3	200	47

TABLE II—TURBIDITY Variations of Waters of Lakes (12 Checked)

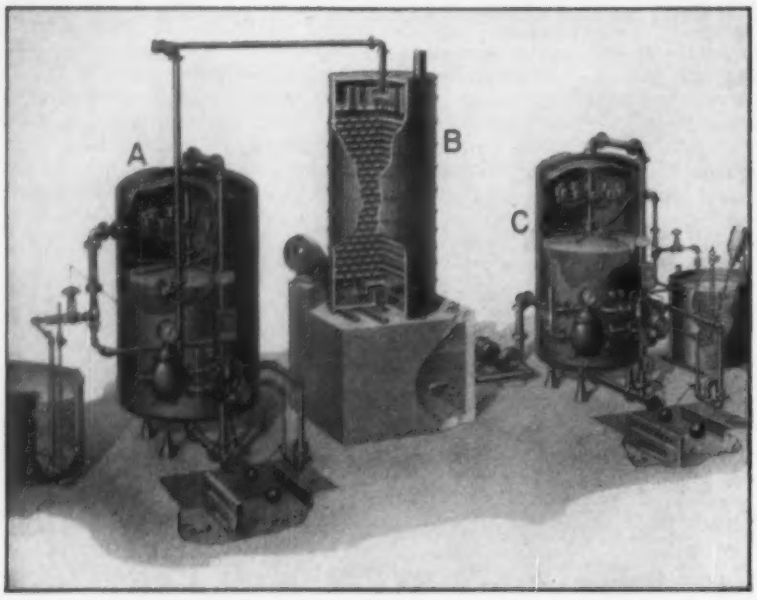
Name of Lake, Pond, or Reservoir	Sampled At	Turbidities (Ppm.) Maximum	Turbidities (Ppm.) Minimum
Auburn	Auburn, N. Y.	30	1
Cayuga	Seneca Falls, N. Y.	100	0
Erie	Buffalo, N. Y.	250	4
	Cleveland, Ohio	115	1
	Erie, Pa	72	2
	Monroe, Mich.	1250	10
Hemlock	Rochester, N. Y.	11	1
Kampeska	Watertown, N. Y.	115	50
Kilby	Portsmouth, Va	55	4
Michigan	Evanston, Ill.	75	4
	Hammond, Ind.	75	1
	Michigan City, Ind.	80	3
	Sheboygan, Wis.	190	3
Oneida	Butler, Pa.	160	2
St. Marys	Eveleth, Minn.	30	5
Salem	Winston-Salem, N. C.	2000	15
Spavinaw	Tulsa, Okla.	50	3
Wichita	Wichita Falls, Tex.	500	15

TABLE III—MAXIMUM AND MINIMUM Colors Over a Year in Surface Waters (20 Checked)

Name and Location	Color (Ppm.) High	Color (Ppm.) Low
Black River, Georgetown, S. C.	180	100
Caloosahatchie Canal, Moorehaven, Fla.	240	45
Calumet River, East Chicago, Ill.	120	15
Charles River, Shannock, R. I.	100	50
Chuctanunda Creek, Amsterdam, N. Y.	160	25
Cuyahoga River, Cleveland, Ohio	160	15
Dan River, South Boston, Va.	90	9
Edisto River, Charleston, S. C.	300	60
Fox River, Green Bay, Wis.	100	30
Great Dismal Swamp, Elizabeth City, N. C.	1200	150
Haw River, Burlington, N. C.	300	50
Hyco River, Denniston, Va.	60	4
James River, Buchanon, Va.	200	15
Lac Dufault, Quebec, Can.	70	40
Nottaway River, Stony Creek, Va.	50	8
Ogeechee River, Eden, Ga.	110	25
Rancocas Creek, Birmingham, N. J.	170	30
Roanoke River, Randolph, Va.	60	5
Satilla River, Waycross, Ga.	130	50
Willis River, Flanagan Mills, Va.	50	20

TABLE IV—FOOD INDUSTRY Users of Treated Waters and Methods of Treatment

Users	Uses: Process	Uses: Cooling	Uses: Boilers	Uses: General	Treating Equipment: Zeolite Softeners	Cold Lime Softeners	Hot Process Softeners	Hydrogen Cation Exchangers	Ion Exchange Demineralization	Filters	Iron, Manganese Removal
Bakeries	X	..	X	X	X	..	..	..	..	X	X
Bottlers	X	..	X	X	X	X	..	X	X	X	X
Breakfast food mfrs.	X	..	X	X	X	X	..	..	..	X	X
Breweries	X	X	X	X	X	X	X	X	..	X	X
Candy mfrs.	X	..	X	X	X	..	..	..	..	X	..
Canneries, various	X	..	X	X	X	..	..	X	..	X	X
Cereal mills	X	X	X	X	X	..	X	X	..	X	X
Cheese mfrs.	..	..	X	X	X	..	..	..	..	X	X
Citrus growers, packers	X	..	X	X	X	..	..	..	..	..	..
Coffee (soluble) mfrs.	X	..	X	X	X	..	..	..	X	..	..
Cold storage plants	X	X	X	X	X	X	..	..	..	X	X
Corn products mfrs.	X	X	X	X	X	X	X	..	..	X	X
Dairies	X	X	X	X	X	..	X	X	..	X	X
Elevators, grain	..	X	X	..	X	..	..	..	..	..	..
Extract mfrs.	X	..	X	X	X	..	..	..	X	..	X
Feed mills	..	X	X	X	X	..	..	..	..	..	X
Fisheries	X	..	X	X	X	..	..	..	..	X	X
Flour mills	..	X	X	X	X	..	..	X	..	X	X
Fruit growers, packers	X	..	X	X	X	..	..	..	..	X	X
Gelatin mfrs.	X	..	X	X	X	..	..	..	X	..	..
Glucose mfrs.	X	X	X	X	X	X	X	..	..	X	X
Hydrogenation plants	..	..	..	X	X	..	..	..	..	..	..
Ice plants	X	X	X	X	X	X	..	X	X	X	X
Ice cream factories	X	X	X	X	X	X	..	..	..	X	X
Jam and jelly makers	X	..	X	X	X	..	..	..	..	..	..
Meat packing plants	X	X	X	X	X	..	X	..	..	X	X
Pectin mfrs.	X	..	X	X	X	..	..	..	..	..	..
Refineries, vegetable oil	..	..	X	X	X	..	..	X	..	..	..
Starch mfrs.	X	..	X	X	X	X	X	..	X	X	X
Stockyards	..	..	X	X	X	..	..	..	..	X	..
Sugar refineries	X	X	X	X	X	..	X	X	X	X	X
Wineries	..	..	..	X	X	..	..	..	..	..	..
Yeast mfrs.	..	..	X	X	X	..	..	..	..	..	..



Demineralization by 3-Step Treatment

FIG. 7. COMPLETE DEMINERALIZATION is obtained by passing water through hydrogen cation exchanger (A), degasifier (B), anion exchanger (C). Tanks at left and right contain, respectively, acid and soda solutions used for regeneration of ion exchange units.

ates of calcium and magnesium. Sodium bicarbonate is also encountered in some waters. In certain areas, the alkalinity may consist mainly or almost entirely of this chemical. Small amounts of carbonate may be found in municipal water supplies that have been treated with lime or caustic silicate, also in certain surface waters during the warmer months of the year, and in occasional well waters.

High alkalinity is undesirable in waters used for making carbonated beverages, since it tends to kill the acidity of the syrup. Also in preparing the popular, pale, Pilsener beers, it is important to keep the alkalinity low and the calcium sulfate hardness high in the brewing water.

Iron and Manganese: Ground waters containing iron and/or manganese, especially deep well and spring waters, usually have iron as ferrous bicarbonate and manganese as manganous bicarbonate. Because these compounds are soluble and colorless, such waters are clear when first drawn.

But on standing in contact with air they develop a faint haze. And on further standing, they precipitate the insoluble hydroxides–deposits of iron that are yellowish to reddish brown and at manganese that are gray to black.

Produce Two-Way Troubles

Both metals are extremely objectionable in all industrial applications. They stain everything with which they come in contact, and they promote growth of clogging masses of iron or manganese bacteria, popularly lumped together as "crenothrix".

In some surface waters and high-color well-waters, the two metals may occur in an organic or chelated form. While they tend to remain in solution and do not deposit readily on exposure to the atmosphere, they still can cause such waters to be exceedingly troublesome. Usually the waters are high in color–and here it is fortunate that the processes used for removing the color will also remove the iron and manganese.

Hydrogen Sulfide: From some wells come "sulfur waters." Containing sulfides, they give off hydrogen sulfide, the gas with the characteristic rotten-egg odor. Others that are free from this H_2S at the well still may develop a sulfide content in the mains due to the action of sulfate-reducing bacteria.

Sulfur waters not only smell bad, but they are also very corrosive. Further, the gas they give off is as poisonous as hydrocyanic acid and should never be allowed to collect in an enclosed space.

Treating Methods Vary With Needs

Since various water supplies differ greatly in composition, and also since requirements vary for different uses in various food fields, it is evident that no one method of treatment will fit all waters for all uses.

Here, we will discuss seven different treating processes, which singly, or in combinations, will make practically any water suitable for the specific requirement of the food industry (see Table IV).

1—Softening With Sodium-Cation Exchanger

Widely used in the food industry is the zeolite process. Equipment employed in the pressure type system–the one universally used here–consists of a steel shell containing a bed of granular or bead-like zeolite supported by layers of graded gravel lying over an underdrain or strainer system (Fig. 4).

Water to be softened is admitted through the upper portion of the shell and uniformly distributed over the surface of the zeolite bed. Then, as it passes evenly downward, the hardness-forming elements–calcium and magnesium–are removed by the cation-exchanging action of the zeolite.

Softened water then passes through the supporting layers of graded gravel and is collected by the underdrain system, flowing to the outlet of the softener, from which it passes to the service lines.

When the water-softening capacity of the zeolite bed is exhausted, the softener is taken out of service and regenerated, employing the following three steps:

A. Backwashing, which is effected by passing a strong current of water upward through the softener. This loosens and regrades the zeolite bed, also holds it in a suspended condition, and removes any dirt that may have collected on top of the bed during the softening run.

B. Salting. This is accomplished by introducing a pre-

determined amount of common-salt solution by means of a distributor that is an integral part of the softener. This solution is uniformly distributed over the top of the bed and evenly passes down through it. During this passage, the salt reacts with the zeolite, removing the calcium and magnesium in the form of the very soluble chlorides, and simultaneously restoring the zeolite to its original active or sodium condition.

C. Rinsing, wherein the calcium and magnesium chlorides, plus the excess salt, are washed to the drain by means of a fairly slow flow of water. The softener is then returned to service.

Now widely employed are fully automatic units in which an ingenious system of electrical controls operate automatically, in connection with a motor-driven multiport valve, to regenerate the zeolite at the end of the softening run. And the softener returns to service, thus assuring a constant supply of soft water and eliminating any possibility of incorrect operation.

Zeolite-softened water is so free from hardness that it is termed "water of zero hardness—or, more commonly, "zero water". It does not waste soap nor alkaline detergents, and it does not form scale when heated or used in the steam boiler (Fig. 5 and 6).

2—Hydrogen-Cation Exchanger

This process differs from the sodium-cation method in that it removes sodium as well as calcium and magnesium, gives hydrogen (instead of sodium) in exchange for them, reduces total solids to the extent of the bicarbonate content of the raw water, and the material is regenerated with acid (usually sulfuric) instead of salt.

Since acids are encountered, the shell is lined with rubber or plastic, and fittings are made of non-corrodible materials. Otherwise, the unit resembles the familiar zeolite water softener.

On the softening run, the calcium, magnesium, and sodium are taken up by the hydrogen-cation exchanger, which gives up an equivalent amount of hydrogen.

The bicarbonates form carbonic acid, which breaks down into water and CO_2. As the latter may readily be removed by aeration or degasification, a water that contains only bicarbonates can be completely demineralized by passing through a hydrogen-cation exchanger and then being aerated.

However, most waters contain some sulfates and chlorides as well as bicarbonates which, on passing through the hydrogen-cation exchanger, form sulfuric and hydrochloric acids. These may be neutralized, or they may be removed by an anion exchanger.

Neutralization may be effected with caustic soda or soda ash, or by mixing in proper proportions with the effluent from a sodium-cation exchanger. Sodium bicarbonate content of this water will neutralize the acidity and furnish whatever degree of alkalinity is required.

In the first case, the effluent is aerated or degasified before adding the alkali. In the second case, aeration or degasification is practiced after mixing the two effluents.

3—Demineralization by Ion Exchange

As mentioned above, the acids formed by the hydrogen-cation exchanger may be taken out by an anion exchanger, thus yielding a demineralized water. The latter unit employs certain synthetic resins that are able to remove acids from solution in much the same manner as the cation exchangers take out basic elements. They are regenerated

Cold-Lime Precipitation Reduces Hardness

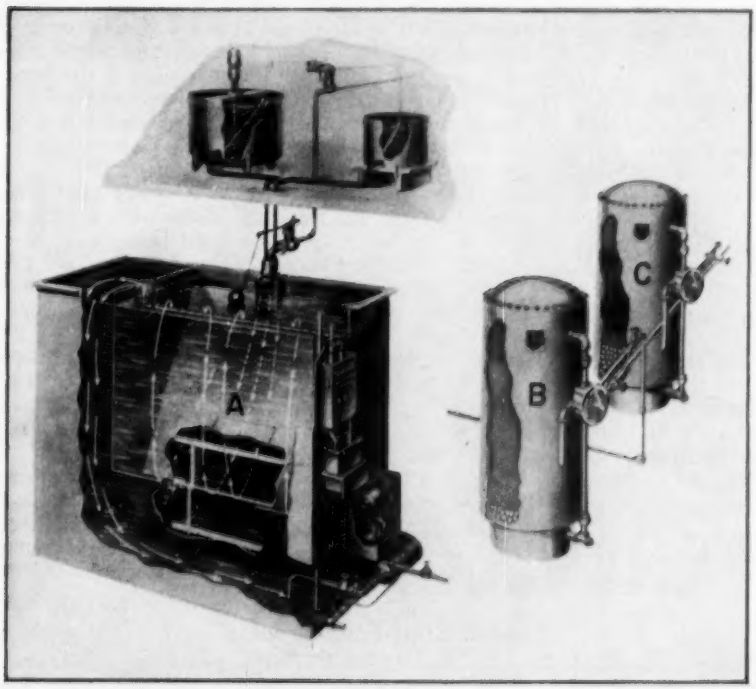


FIG. 8. COLD LINE precipitator for dealkalizing, softening, filtering, taste and color removal, comprises Precipitator (A), with lime and coagulant tanks above, sand filter (B), activated carbon unit (C).

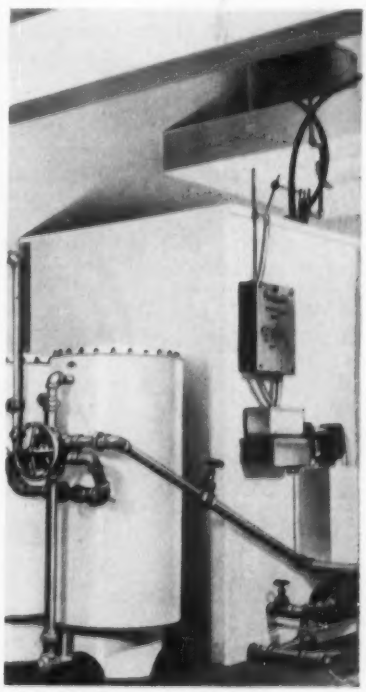


FIG. 9. ACTUAL installation of package type precipitator in bottling plant.

Hot-Lime System Reduces Hardness, Removes CO_2, Air

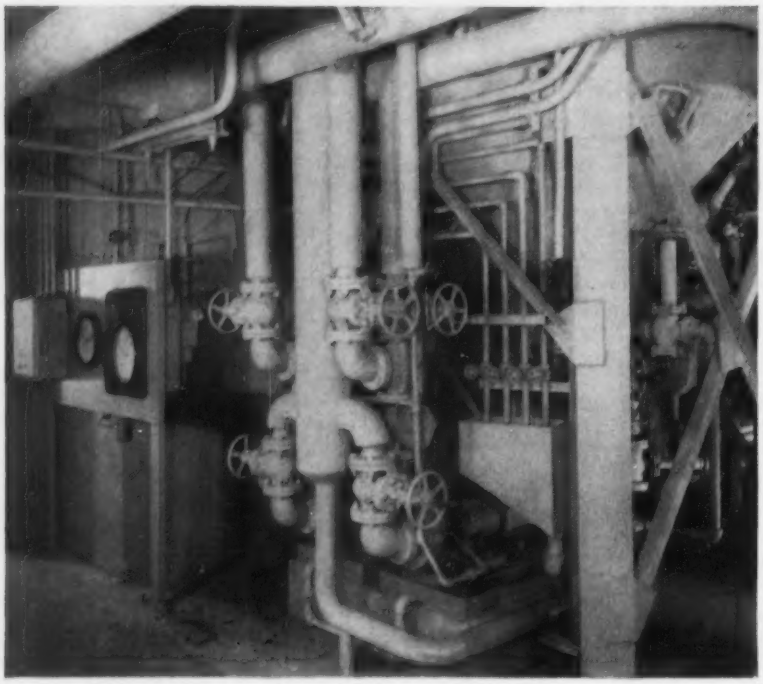


FIG. 10. TWO-STAGE hot lime zeolite water softener in soya plant. Shown are lower portion of softening unit with operating controls and valves, sampling provisions. Zeolite units are not visible.

FIG 11. IN UNIT, water is sprayed through steam (A), mixed with chemicals (B), leaves at (C).

with an alkali instead of the salt or acid used in the cation exchangers. Anion exchangers may be broadly divided into two classifications—the weakly-basic and the strongly-basic.

The former will remove strong acids, such as sulfuric and hydrochloric, but not such weak ones as silicic and carbonic.

On the other hand, the strongly-basic exchangers will remove weak acids as well as strong ones. These are used in demineralizing boiler feedwaters, otherwise the silica would not be eliminated. Regenerant used is caustic soda. For the weakly-basic anion exchangers soda ash is employed.

Several types of hookups are employed with a strongly-basic anion exchanger. Most widely used is the 2-step arrangement with degasifier. Here, there are: (a) A hydrogen-cation exchanger unit, (b. degasifier, and (c) strongly-basic anion exchanger (Fig. 7).

Other hookups are: The 2-step without degasifier, the mixed bed, the 4-step with degasifier, and the hydrogen-cation exchanger and mixed bed with degasifier.

Arrangement used with a weakly-basic anion exchanger usually comprises the hydrogen-cation exchanger, and weakly-basic anion exchanger, followed by an aerator or degasifier.

4—Cold Lime Process

In this method, bulk of the hardness is precipitated as calcium carbonate and magnesium hydroxide. This is done by adding accurately measured dosages of hydrated lime or hydrated lime and soda ash. In addition, a small amount of coagulant (generally aluminum sulfate) is used to "floc" the finely divided precipitates.

This process will not soften the water completely, but it can reduce it to about 4 gr./gal. (68 ppm.). It will also cut down the alkalinity due to bicarbonate hardness.

Fig. 8 illustrates the sludge-blanket type precipitator (Permutit) that is widely used in carrying out the cold-lime process. It is also employed in coagulating turbid or high-color water. In it, the raw water is mixed with properly proportioned amounts of chemicals in the down-comer section, then rises through a suspended blanket of sludge in another section, which is so designed that the cross-sectional area increases upwardly.

As the treated water rises through this section, its upward velocity is insufficient to raise the sludge any farther. In practice, there is a clear line of demarcation between the surface of the sludge blanket and the clarified water above it.

Chemicals used may be lime and a coagulant, or lime plus soda ash plus a coagulant. If silica removal is required, dolomitic lime or activated magnesia may be used.

In general, the cold lime-soda softener reduces hardness of a water to about 4 gr./gal. When zero hardness is desired, the effluent is passed, after filtration, through zeolite softeners. This is known as the combinatoin cold lime-zeolite process.

Filtration of the effluent from the cold lime process before use is for the purpose of removing traces of suspended matter. Where crystal clear effluents are not necessary (as is often the case with cooling water), filtration may be omitted.

5—Hot Lime-Soda Process

This system is widely used in softening boiler feed waters. And here is how it differs from the cold lime soda process: (a) It is carried out at temperatures around the boiling point of water, (b) it reduces the hardness to a

greater extent, (c) no coagulant is required, (d) by use of dolomitic lime or activated magnesia it removes silica more economically, and (e) a deaeration of the water is effected.

Hardness may be reduced to less than 1½ gr. without use of large excesses of chemicals. This residual may be cut to practically zero either by passing the effluent through a sodium-cation exchanger or by a second-stage treatment with phosphate.

Without use of an integral deaerator, the primary heater will reduce dissolved oxygen to less than 0.3 of a milliliter per liter. And with use of an integral deaerator, the dissolved oxygen will be reduced to less than 0.005 ml./l.

How Unit Operates

In the hot lime soda unit (Fig. 11), water is sprayed through an atmosphere of low-pressure steam in the upper part of the softener. This heats it to within a few degrees of boiling, drives off the free CO_2 (and often some of the half-bound CO_2), and deaerates the water to less than 0.3 ml./l.

Falling into the upper level of the softener, the hot water is mixed with measured amounts of the chemicals. At the prevailing high temperature, these react with the constituent causing hardness, precipitating it as a rapidly settling sludge that drops to the bottom of the softener. It is removed by either periodical or continuous desludging.

If further deaeration is not needed, the settled water is passed through filters and on to service. If complete deaeration is required, the effluent from the filters is fed to the integral deaerator, where all of the steam required for the primary heater is blown through it, thus effecting very complete deaeration. Water then flows to the service pump and from there to the boiler feed-water line.

Deaeration: Solubility of oxygen, nitrogen, and CO_2 is zero at the boiling point of water, so these gases can be removed from boiler feedwater by boiling and blowing steam through it to scavenge them to the atmosphere. For low pressure boilers, deaeration does not need to be so complete as for high pressure ones.

For the former, a spray heater (or some other design of single-pass heater) should reduce dissolved oxygen to less than 0.3 ml./l. For high pressure boilers, a reduction to below 0.005 ml./l. can be obtained by, not only heating the boiler feedwater to the boiling point, but also scrubbing it with steam.

There are several designs of deaerators, but the following brief description of the reboiling spray type will illustrate the general principles:

In this unit (shown in Fig. 12) steam is used twice. It is first blown through the hot water coming from the spray heater, then it is used in the spray heater. As this water has already been deaerated to less than 0.3 ml./l. of dissolved oxygen, the large volume of steam blown through it thoroughly scrubs out the remaining gases. These are vented to the atmosphere, usually through a vent condenser.

Separate deaerators are used for the effluents from zeolite, hydrogen-cation exchanger, demineralization, cold

Deaeration, Filtering, Chlorination

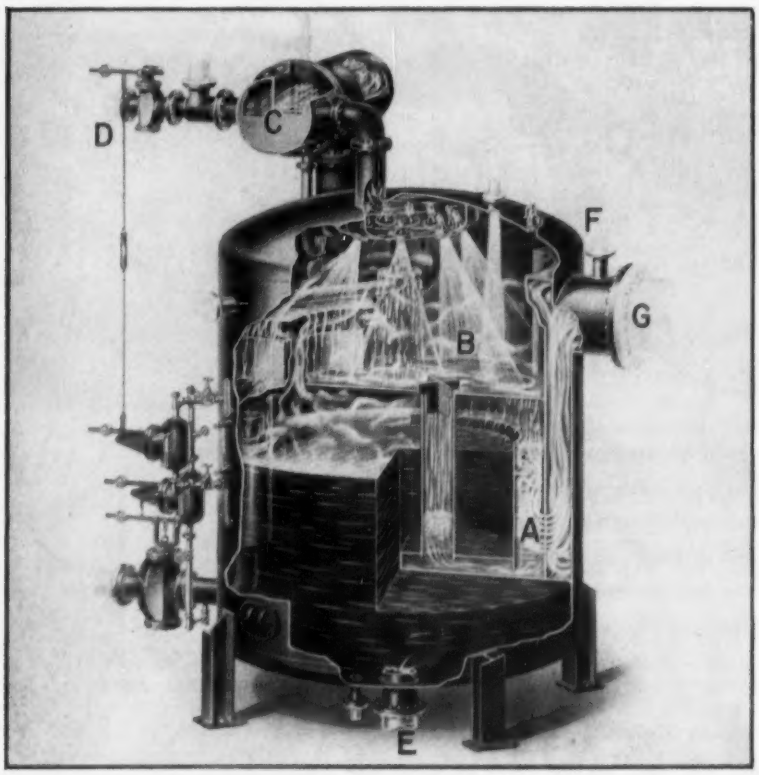


FIG. 12. IN REBOILING DEAERATOR, steam is blown through hot water coming from spray heater at (A), then it is used in the spray heater (B). Gases scrubbed from water are discharged through vent condenser (C). Water enters at (D), leaves at (E). Steam enters at (F), leaves at (G).

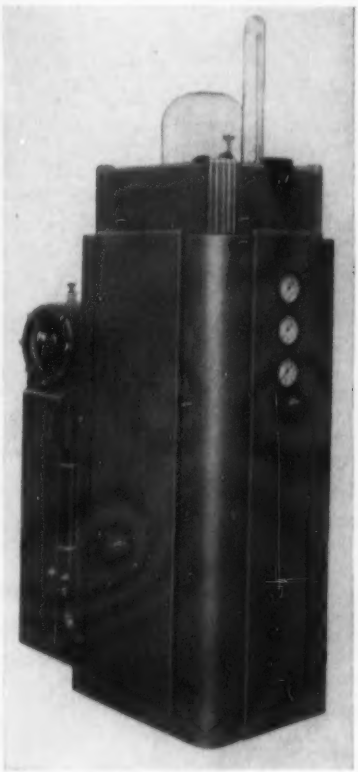


FIG. 13. CHLORINATOR meters liquid chlorine to treated water thus insuring its sterility. (Wallace & Tiernan, Inc. photo)

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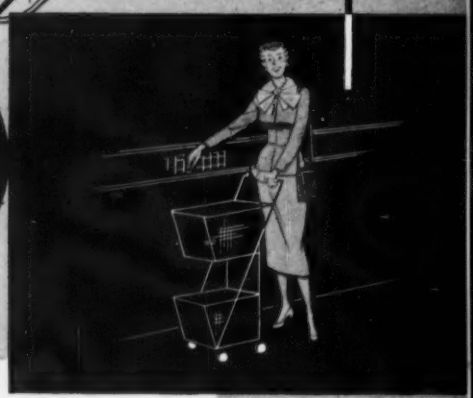

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lime-soda, or cold lime-zeolite plants. The deaerator can be incorporated as an integral part of the hot-lime-soda water softener.

6—Iron and Manganese Removal

When present as soluble bicarbonates, iron and manganese may be removed by one of three methods:

A. Aeration and filtration. Here the water is first aerated, with or without addition of an alkali (depending on its chemical characteristics), settled for a short time, and finally filtered. This treatment oxidizes soluble ferrous or manganous bicarbonates to insoluble, hydrated, higher oxides, which may then be settled out, with the last traces removed by filtration.

B. Treatment with manganese zeolite. This material acts as an oxidizing contact medium, converting the metals to insoluble hydroxides, which are removed by the filtering action of the zeolite bed. The specially prepared manganese zeolite exerts no softening action on the water.

At periodic intervals, the zeolite is regenerated with a solution of permanganate of potash, which restores its oxidizing powers. Frequently, a small amount of air is pumped into the water ahead of the manganese zeolite. This effects economies in use of the regenerating material.

C. Zeolite water softener. The iron and/or manganese are removed simultaneously with lime and magnesia (and in a similar manner). When the zeolite is regenerated with a solution of common salt, these materials are removed in the form of their soluble chlorides, which are discharged to the sewer, together with the soluble lime and magnesia byproducts.

This method should not be confused with (2). For the zeolite water softener removes both hardness and iron or manganese, while the manganese zeolite filter takes out only iron or manganese and has no effect on hardness.

There are a large number of zeolite units so used for softening the hard waters that also contain soluble iron or manganese, thus furnishing a clear, soft, iron- and manganese-free water and eliminating the processing difficulties caused by both of these impurities.

Hydrogen Sulfide Removal. Aeration and detention, followed by chlorination to oxidize any sulfide residuals, is the usual method for removing H_2S. However, if the content is more than a few ppm., or if the alkalinity is high, then other methods may be required. This is because aeration of such waters usually results in removing the free CO_2 and raising the pH so that the remaining sulfide is mostly present as an alkali or alkaline-earth sulfide.

Such waters may be treated with flue gas in an aerator with enclosed sides. The CO_2 in this gas lowers the pH and liberates the H_2S, the great bulk of which is discharged with the spent gas. The CO_2 is then removed by allowing the water to fall through an open aerator, after which any small sulfide residuals may be removed by chlorination.

7—Clarification and Sterilization

Turbid or highly colored surface waters can be clarified by coagulation, settling, and filtration. With only a little turbidity, coagulation plus filtration may be all that is needed. But if the amount of suspended solids is large, then coagulation plus settling plus filtration is advisable. The usual coagulant is sulfate of alumina (also known as filter alum). Also widely used is ferric sulfate.

The coagulant produces a gelatinous precipitate that attracts and enmeshes the finely divided insoluble matter, forming larger aggregations known as the "floc". This can easily be removed by filtration or by settling and filtration. If a fairly large amount of suspended matter is present, settling will remove the great bulk of it. This relieves the filter of a large portion of the load and lengthens the runs.

Two types of coagulation and settling equipment are: the floc-former (Permutit) and the precipitator. In the former, the raw water enters a chamber in which an agitator rapidly mixes it with the added coagulant. After this, the water passes through a series of two or three chambers in which a slow, rolling mix (produced by slowly moving paddles) aids in forming a large and easily settled floc.

Water then goes to a basin, where the bulk of the sludge settles out, after which it passes to the filters.

The second type of coagulation and settling equipment —the precipitator shown in Fig. 8—has already been described under the cold lime process.

If turbidity in the raw water is small, it is possible to pass it directly to the filters. This is often done, especially if the volumes of water handled are not very large. But if the amounts of suspended solids are above 15 or 20 ppm., or if the amounts of water to be handled are large, settling before filtration should be practiced.

Filters can be either of the pressure or gravity type. The gravity type is most widely used in industry.

Two types of medium are used in these filters: Sand or Anthrafilt (Hudson Coal Co.). The latter material (non-siliceous in nature) is favored for boiler feed water, since it eliminates the possibility of a silica pickup.

In any case, filtration is effected by flowing the water downward through the fine medium and its supporting layers of coarser material. If the coagulation has been properly carried out, the filtered water should be bright, clear, and practically colorless.

Accumulations of foreign material are periodically removed by back-washing, which is accomplished by sending a strong current of water upward through the filter bed. This suspends and separates the granules of the medium, lifts and flushes out the foreign matter, and hydraulically regrades the bed, thus cleansing and restoring it to its original condition.

Disinfection or sterilization of the water is almost invariably effected by chlorination. For the smaller size plants, a solid material—hypochlorite—may be used, but for the larger plants liquefied chlorine gas is most economical. Chlorination may be effected (a) before clarification (pre-chlorination), (b) after clarification (post-chlorination), or (c) both before and after. Fig. 13 shows a chlorinator used for feeding the liquefied product.

Taste and Odor Removal

Disagreeable tastes and odors are usually organic in nature—due to decaying vegetation, crenothrix, algae, or other microorganisms. Or they may be due to trade wastes or their reaction products on chlorination.

Activated carbon is widely employed for abolishing objectionable tastes and odors from water. If open coagulation and settling equipment is used, then powdered activated carbon may be added to the water as it enters the equipment, and this may be preceded by aeration. In pressure equipment, use of filters having beds of granular activated carbon is common.

As the actual amounts of substances producing disagreeable tastes and odors are very minute, a tremendous amount of water can be passed through an activated carbon filter before its capacity is exhausted. When this occurs, the bed is discarded and a new one put in.

Life of the bed depends largely on the particular water supply being treated, but it is seldom less than six months and may be several years. Formerly, beds were replaced at least once a year, but it is now the practice to keep a refill on hand, ready to be put in at the very first indication of a break through.

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Research + Innovations Create New Product

New information, new methods, new product form, and new package are "ingredients" which General Mills put into its unique pie crust mix

END PRODUCT is a pie with a tender, flaky crust. You can actually lift off flakes with a spoon.

IN DEVELOPING the new homogenized pie crust mix, researchers at General Mills learned some interesting facts about putting flour, shortening, salt, and water together.

One phase was a study of how water reacts with the flour. Water must hydrate the gluten in flour long enough so the starch becomes pie crust. For tender pie crust, this development is necessary—up to a point. But if it isn't controlled properly, it can produce toughness. If too much water is used, or if it gets through to the flour and excessively hydrates the gluten, a tough crust results.

One role of the shortening is to help control this hydration. The shortening covers the flour and keeps hydration in check by controlling the amount of liquid that gets to the flour. It's pretty hard for every housewife to be expert at cutting in the shortening with a fork. To achieve perfect distribution, the Betty Crocker food experts decided to do the job for her.

It Took Two Shortenings

The General Mills research staff tried various methods of cutting in the shortening. They milled the shortening, ground it, froze it, sprayed it into cold water to get little shot balls. They even chilled both the flour and shortening. Trouble with the last method, chilling prevented getting enough shortening into the flour.

Research finally solved the problem by using two separate shortenings, something no housewife could do at home. The shortenings, both fresh, bland and sweet, were developed for the special purposes they perform. One, soft, for tenderness, is blended in so completely that every particle of flour is coated. This protective coating keeps the liquid from reaching the flour gluten and hydrating it excessively.

The second shortening is hard shortening in rich flakes. These flakes melt slowly during baking, raising the pastry into delicate layers. Research men began to scent success as they actually lifted the rich, golden flakes off the finished crust with a butter knife. For the first time in pie-making, research could guarantee housewives all the good of the shortening.

Ways of homogenizing the shortenings and flour were developed. This was a new concept. Homogenization, usually thought of in connection with liquids, was applied to the technology of thoroughly intermixing solids.

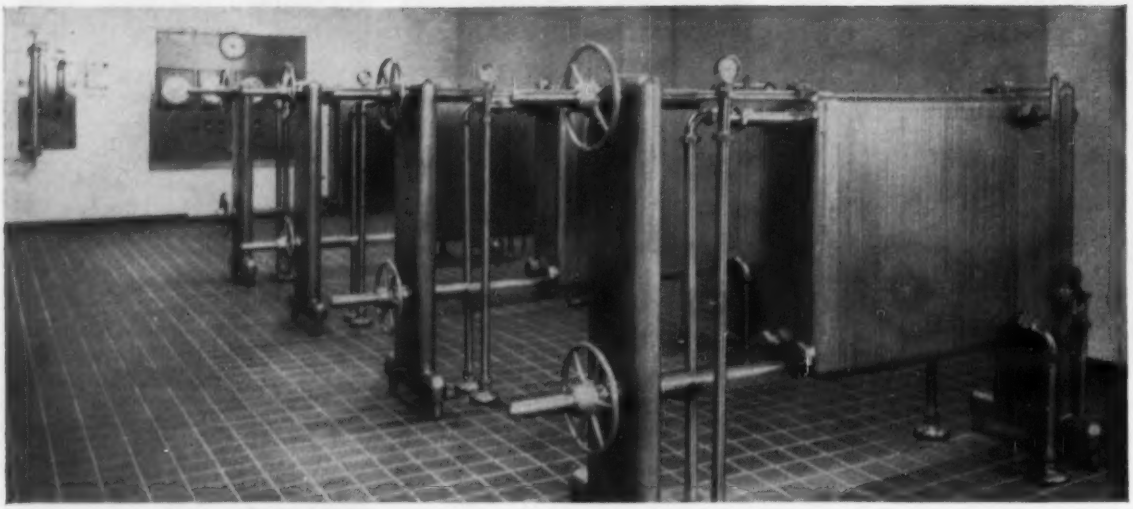
Homogenizing Good—But

Homogenization provided the perfect way to cut in the shortening so every particle of flour was coated and less water was required.

This was a distinct advantage because it meant that housewives could handle the dough as much as they wanted and still get a tender flaky crust every time.

It also had limitations. The mix looked greasy, not at all like the free flowing form of conventional pie crust mixes on the market. One food researcher said: "It looked like a dead-end trail until we realized what the trouble was. We had been trying to make an improved pie crust mix that looked just like the mix in Grandma's kitchen mixing bowl."

(*Turn to page 171*)



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FE STAFF

Maintenance of scientific control in the manufacture of superior quality beer—with special attention to efficiency—has always been emphasized by top management at Theo. Hamm Brewing Co., St. Paul, Minn.

An example of this brewery's quality control has been the recent installation of advanced, completely enclosed wort-coolers. These heat-exchangers represent only a small portion of the latest facilities installed by this trail-blazing brewery since launching of its $20,000,000 postwar modernization program.

These are the seven benefits which have been gained:

- **Faster cooling of wort**
- **Longer "cold break" time**
- **Need of less cooling water**
- **No losses of wort during cooling**
- **Protection of wort from contamination**
- **Easier and speedier cleaning of coolers**
- **Control over the injection of sterile air into wort**

As for the former, open-type method of cooling hot wort, rated hourly capacity of each heat-exchanger was 300 bbl. Wort losses—though not significant—took place, and coolers had to be installed in a room sterilized by ultraviolet lamps. Moreover, 2 parts of cooling water was required for 1 part of hot wort, with outgoing water temperature about 120 F.

New System Detailed

Today the cooling is carried out by four completely enclosed, plate-type, stainless steel heat-exchangers with a combined capacity of 553 bbl.-per-hr. Moreover, the room does not have to be sterilized with ultra-violet lamps.

This cooling is now a continuous 2-stage operation, with 55-deg.-F. well water used as the 1st-stage refrigerant and 30-deg.-F. propylene glycol as the 2nd stage. First stage comprises 161 cooling plates and second has 25.

Hot wort (190 F.) is water-cooled to 60 F., and then glycol-cooled to 47 F. Water (143 F.) discharged from cooler is re-used for subsequent brews. Then glycol (40 F.) is recirculated for 30-deg.-F. cooling through an ammonia-type heat-exchanger. Also, only 1.3 parts of cooling water is required for 2 parts of wort.

Because output is almost doubled since the installation of these advanced heat-exchangers, this brewery is now provided with more "cold break" time (settling of wort).

Present coolers, too, are easier to clean, since all parts are now within easy reach of the attendant. In addition, it takes less time to cleanse them All that is necessary is to pump hot caustic solution and rinse water through them—and then brush-clean them only once a week. In contrast, former coolers required manual brush-cleaning after almost every brew.

Entrainment of air in wort is also automatically and accurately controlled with a Fischer-Porter flowmeter. However, before the air is injected (under a pressure of 60 psi.) in the wort line, it is deodorized by activated carbon-filtration and sterilized by ultraviolet lamps. The air meter, hooked up to a remotely-controlled recorder, also provides continuous check on the air supply.

Panel Control

On the control panel, there is an automatic unit for regulating the amount of propylene glycol going into the heat exchangers. Thus controller's thermostatic bulbs register temperature of cold wort flowing through heat exchanger. And if temperature rises above a pre-set point, a diaphragm valve automatically opens to pass more glycol into system. The temperature of wort at the discharge end of coolers is also automatically recorded on panel board.

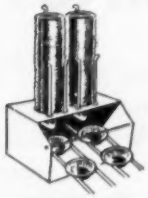
DESIGNED FOR YOUR PRODUCTION LINE

THE *Cochran* 250 FOIL POT PIE PAN

SPECIFICATIONS

Top outside $4\frac{31}{32}$" Top Inside $4\frac{3}{8}$"
Bottom $2\frac{7}{8}$" Depth Slant $1\frac{13}{32}$"
Holds 8 oz. Pot Pie

4 ADDED FEATURES FOR PRODUCTION EASE



1. TROUBLE FREE DISPENSING

Fully curled edge, dimensional stability and extra bottom strength for production speed.

2. BETTER MOLD FIT

Dimensional stability for better plate holder fit eliminating crimper dough build-up.

3. WILL TAKE A PUSH

Bottom and sides engineered for extra strength. No more cripples to slow up production and disfigure your product.

4. RAIL LINE STRENGTH

Out of the plate holder onto the belt . . . without fail . . . without collapse.

In the making of Pot Pies it's PRODUCTION EASE that counts! Cochran's 250 pot pie pan has the rigidity, uniformity and precision that speed up production. From top to bottom it has been designed, engineered and constructed for true dimensional stability.

As an added bonus the Cochran 250 can be quality embossed with your trade name insuring consumer recognition. Mrs. Housewife will love your product in the Cochran 250. It offers her safe handling, quality feel and enhances your product.

Whether you produce or contract your production . . . contact your nearest Cochran sales office. Their aluminum foil experience and rigid foil container engineering skill will make the difference that counts on your production line.

Cochran FOIL COMPANY
Incorporated

PRODUCTS DIVISION

Hippodrome Bldg.	P. O. Box 1466	712 Wrigley Bldg.	500 Fifth Ave.
Cleveland 15, Ohio	Louisville, Kentucky	Chicago 11, Ill.	New York 36, N. Y.

Cochran Foil food containers – the best thing next to food!

CLIP AND MAIL TODAY

FE4

Cochran Foil Company, Inc., Products Division
P.O. Box 1466, Louisville Kentucky

Please send me a sample and detailed information on the 250 Foil Pot Pie Pan.

Name_____

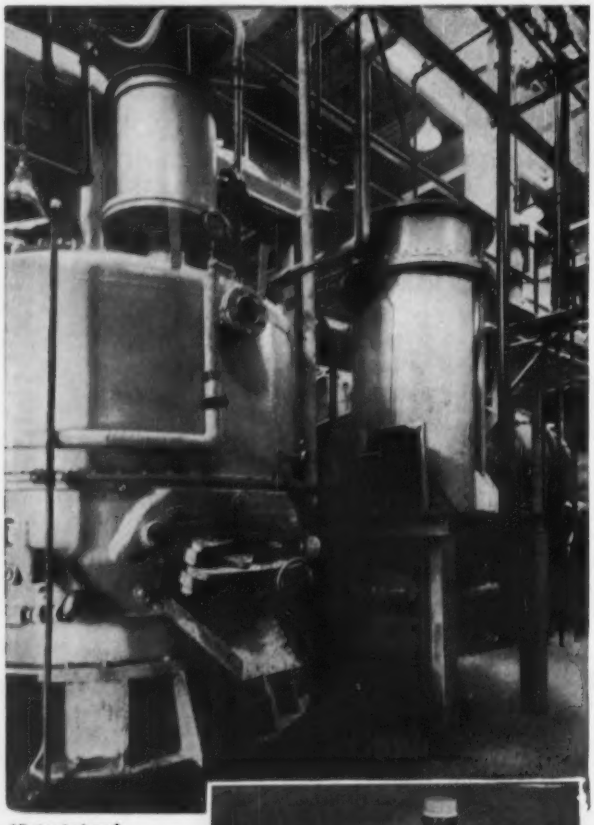
Address_____

City_____ State_____

Company_____

For more information, use coupon on last page.

Takes the WAVER OUT of spice flavor...



*Patented and Patents Pending

Laboratory Control Assures Predictable Flavor Quality in SOLUBLIZED SEASONINGS

Now, you can improve the taste of your products with the smooth mellow blend of **controlled** spice flavors in SOLUBLIZED SEASONINGS Griffith chemists maintain a new high standard of potency, purity and uniformity in each extractive—by an exclusive extraction process* developed by Griffith research.

With each spice extractive always of uniform quality, blending is a laboratory science that assures flavor control for users of SOLUBLIZED SEASONINGS. That's a big sales advantage worth looking into—**today.**

The GRIFFITH LABORATORIES, Inc.

In Canada—The Griffith Laboratories, Ltd.

Another triumph of Griffith research—devoted solely to pioneering better food processing

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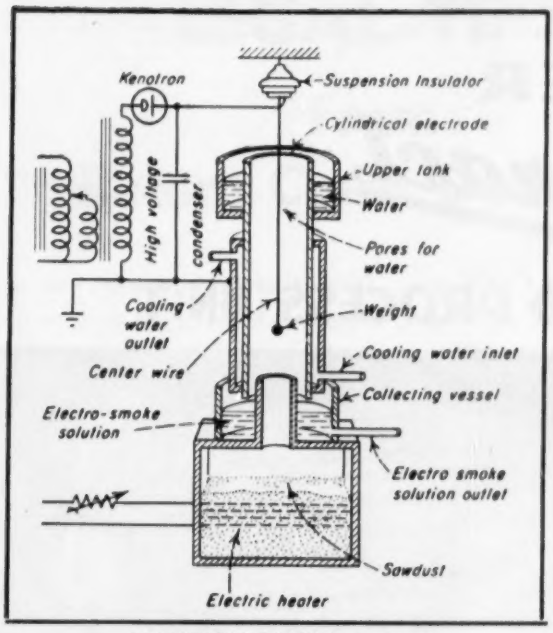
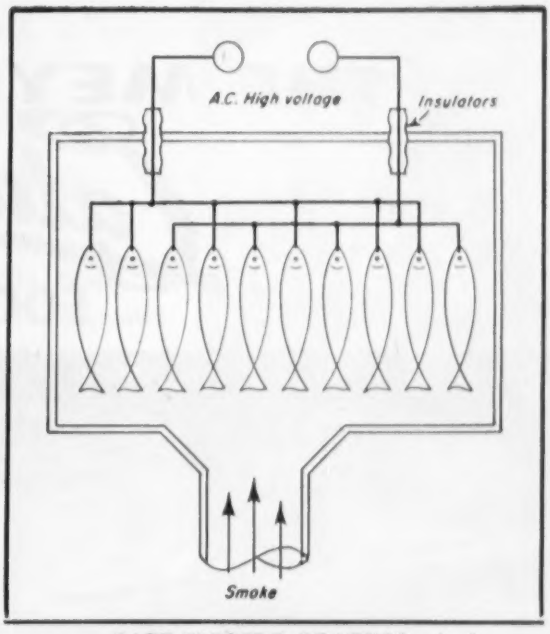


SOLUTION MAKER is new development following . . .



. . . FAST ELECTRO COATING. And thus opened are possibilities of . . .

Electro-Smoke Solution

SPEEDS CURING

Cuts treating of meats and fish to hours. Also improves penetration, sterilization . . . Canned goods smoked by adding new liquid . . . Foresee electrostatic strides with other foods

Y. TORIYAMA, S. NAGAO, T. SUTO and T. TAKAHASHI

First two authors on Engineering Faculty, Tohoku University, Sendai, Japan; second two with Hitachi Ltd., Tokyo

Striking new speed in smoking meat and fish—with more uniform penetration—is being achieved with a special new smoke-solution produced in an electrode operation.

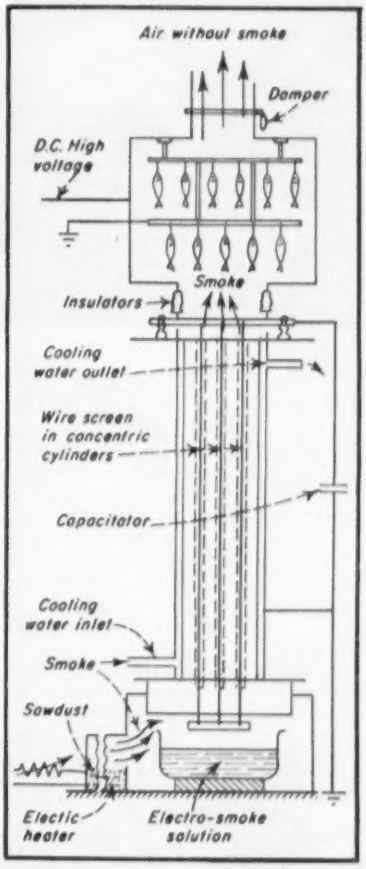
And teaming of this new technique with the recently developed electrostatic method for rapid coating of products is seen bringing even faster production of high-quality smoked goods.

First, a word about the electrostatic method: This slashes processing time through the technique of suspending fish on an insulated rack in the familiar smokehouse and applying a minimum of 10 kv. of a.c. current through an electrode hooked to them. Thus an electrostatic smoke-coating is put on the skin. (FE Sept. '53, p. 70).

This has cut treating time for small seafood from hours to minutes. And large-fish smoking has been shortened from days to hours.

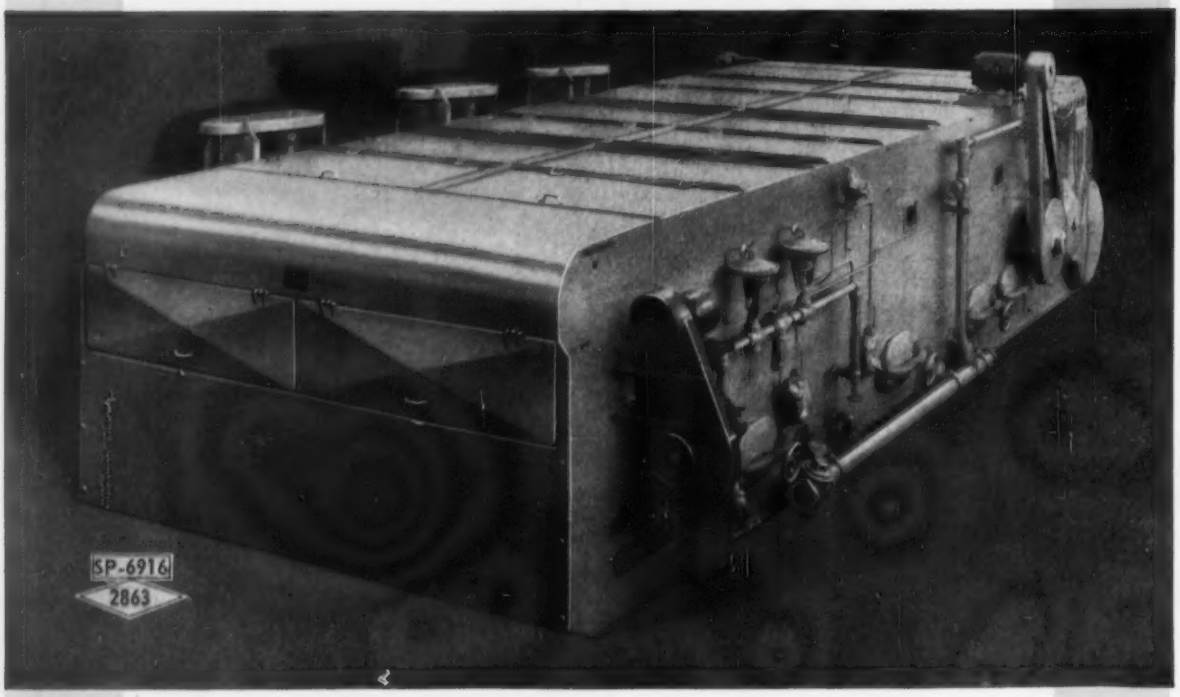
Further, higher voltages and greater separation of the racked fish can increase uniformity of coating. Also, processing speed can be augmented by using d.c. current. The screen-rack is then utilized as a negative electrode,

(Turn to page 210)



. . . THIS COMBINATION of two techniques to achieve lowest-cost, highest-efficiency operations.

THE MEYER *Cataract* FOOD PROCESS UNIT



for Pasteurizing, Cooling and Exhausting

A MEYER Cataract Food Process Unit is backed by 50 years experience in building efficient bottling equipment including Pasteurizers for the Brewing and other Beverage Industries and processing units for the grape Juice Industry.

The MEYER Cataract Food Process Unit is built for efficient processing. Food products may be cooled, heated or heated and cooled with the MEYER Food Process Unit at very high efficiency. The entire process of heating the product to a pre-determined temperature and/or a subsequent cooling, is accomplished within a single unit. It has proved highly efficient in a wide variety of applications, since 1939.

Designed to minimum floor space, feed at one end, discharge at the other end; also built in Multier design where floor space is limited.

The entire cooling or heating or heating and cooling operates on a continuous basis, under mechanical control. Product handling, waste water and labor requirements are minimized. Sanitary design provides for quick cleaning and visual inspection of all surfaces contacting the product packaged.

The MEYER Cataract Food Process Unit is designed for products in any and most forms of the prevailing size of glass or tin containers, likely to be adopted, from any diameter to 12½" high and particularly where one unit is to handle all types. Provisions can be made to handle containers of larger heights. Tell us of your requirements.

USED THE WORLD OVER Dumore BOTTLING EQUIPMENT

50th ANNIVERSARY 1904 • 1954

GEO. J. MEYER MANUFACTURING CO.
CUDAHY, WISCONSIN

LEGAL TIPS

From Recent Court Decisions

★ How *Much* Mold Does It Take? . . . ★ What's *Positive* Proof? . . . ★ What If *His* Resembles *Yours*? . . . ★ *When* Is a Warehouseman Liable? . . . ★ What Are the Tangles in *Shipment Rejections*? . . . ★ Who Gets Paid When *Receipts* Are Pledged? . . . ★ Who's Liable When *Eaters Get Sick*? . . . ★ What's the Fate of *Negligent Freezers*? . . . ★ Why Should You Shun *Speculations* of Damage? . . . ★ And Have You Unknowingly *Murdered* Your Own Insurance?

LEO T. PARKER

Attorney at Law, Cincinnati

A number of outstanding decisions pertinent to the food field were rendered by higher courts over the last year—bringing the pointed question: What specific lessons may the food manufacturer learn from these cases?

Here, we will review these late cases to spotlight the points, since pertinent knowledge of the litigation will aid you in keeping clear of such troubles.

Or if you already are unavoidably in a suit, these facts can serve you and your lawyers in successfully carrying your case.

Legal Gage of Moldiness

The Government is not required to prove unfitness of food other than filth and decomposition, according to a recent higher court. And where a test of tomato paste disclosed decomposed matter in all samples (more substantially in some than in others, yet enough to bring the average well above administrative tolerance), the product was termed adulterated and subject to condemnation.

Also, this court held that although a food may be "approved" by Government agents, the product is still subject to condemnation if later found unfit.

For illustration, in *United States* v. Cases (212 Fed., 2nd, 567), a large quantity of imported tomato paste was initially sampled, and a few days later the importer received FDA notice of its approval. Thereupon, the importer paid for the shipment and removed and sold several cases from the lot.

But several months later, a Government food inspector checking the warehouse noted that several cases had been recoopered. And his closer inspection revealed a number of cans had been resoldered. This led to retesting of the shipment—disclosing excessive mold.

The subsequent trial spelled out how chemists had used the Howard Mold Count, microscopically examining 25 fields of view on each of 4 slides, or a total of 100 fields (minimum of 50 required in Howard technique). They thus noted number of fields in which mold filaments appeared and so deduced that tomatoes with rotted tissues had been used.

In other words, the chemists' findings were based on number of fields showing filaments, not on amount of mold in each. Thus, it is interesting that the court held condemnation of the paste valid, notwithstanding that no actual testimony was given disclosing the exact decomposition. The court said:

"It is undisputed that mold in tomato products indicates decomposition. It is also undisputed that when, as here, it results from rot in the tomatoes present before processing, it is not visible to the naked eye, but is detectable only by microscopic examination."

This was so although it was admitted that the mold counts made by 4 government analysts on 18 different cans varied from a low of 8 to a high of 70, and further that the Government's tolerance was 40%.

Need for Proof-Positive

The above circumstances were held to have established proof. *Positive* proof is demanded. This was borne out when another higher court declared that though a plant is proved

unclean and filthy, nevertheless food packed there is not subject to condemnation unless agents prove it was processed at the exact time it was found filthy.

Take the litigation designated 598 Cases v. *United States* (211 Fed., 2nd, 251), wherein agents seized and condemned 598 cases of tomatoes shipped interstate. It was alleged the product consisted wholly or in part of filthy materials—fly eggs, maggots, and decomposed matter.

Further testimony showed the unsorted tomatoes used in the canning contained large numbers of decomposed tomatoes, and that the plant was infested with flies, fly eggs, and larvae, also that the operations weren't adequate to remove all eggs and larvae, and so much decomposed material went into the tomato juice produced.

With this evidence, the lower court ordered that various shipments of tomatoes must be condemned and granted a premanent injunction restraining the packer from introducing into interstate commerce canned tomato products "heretofore packed" at this plant.

Thereupon, the packer appealed to the higher court and proved that many of the tested 598 cases were shipped before the present suit was filed, it being noted that the code numbers on the cans were not changed every day.

In view of this evidence the higher court held that condemnation of the 598 cases of tomatoes was illegal.

Similar Names and Colors

A higher court lately held that a trade-mark is not infringed by a similar trade-mark merely because both use a common word.

However, this court said that a manufacturer who uses containers that are too similar to those of a competitor stands to be enjoined.

For example, in *American Chicle Co. v. Topps Chewing Gum* (210 Fed., 2nd, 680), it was brought out that the former concern had begun marketing a chlorophyll chewing gum under the trade-name "Clorets," and that some time later the latter company began making and selling a chlorophyll gum called "Clor-Aid."

Both packages were small, green-white-red cardboard containers of somewhat similar appearance, and thereupon the former company sued the latter.

The court refused to hold there was a case on the trade-mark, saying:

"Defendant's trade-mark, Clor-Aid, does not infringe plaintiff's trade-name, Clorets. Since (thanks to the great popularity of chlorophyll products), the word 'clor' is common to the trade, it cannot be used as a basis for trade-mark infringement."

However, the higher court did enjoin the defendant from marketing its chlorophyll chewing gum in small, green-white-red cardboard containers similar to those used by the plaintiff.

Vital Warehousing Factors

Recently, the author received a letter in which a food processor asked: "If a manufacturer accepts a warehouse receipt, or other paper acknowledging that he will limit the warehouseman's liability in case the merchandise is lost, destroyed, or damaged, is the manufacturer bound not to sue the warehouseman for full value of the merchandise?

"Also, if the food products are destroyed or lost through negligence of the warehouseman, is a clause in the receipt valid where it is shown the warehouse employees negligently caused the loss?

"I've heard it argued that if the owner of goods signs a receipt or contract in which he agrees to exonerate a warehouseman for negligence of his workers, then the signer can be held to the bargain, because if he doesn't want to exonerate the warehouseman for loss he should not, then, sign such a contract. In any event, what do the courts hold?"

Answer to the last question is this: Although the owner of the goods signs such a paper, nevertheless the courts won't allow the warehouseman to avoid liability.

In *England v. Lyon Fireproof Storage Co.* (94 Cal., App. 562, 271, p. 532) the court said that under no "circumstances" may either a carrier or warehouseman limit his responsibility concerned with negligence of his employees in such loss.

For comparison, in *Brasch v. Sloan's Moving & Storage Co.* (176 S. W., 2nd, 58), the higher court declared that a limitation clause in a warehouse receipt is valid if the testimony shows the receipt was "accepted" by the owner of the goods who had opportunity to pay a higher rate for full coverage — provided the testimony proves positively that the loss did not result from negligence of the warehouseman or his employes. The court said:

"While a warehouseman may not avoid his liability for negligence, he may nevertheless stipulate with the owner as to what the extent of the latter's recovery shall be, where the rate charged the owner is based upon an agreed valuation."

Also, a late high court decision holds that neither a carrier nor a warehouseman can limit liability for ordinary loss of, or damage to, transported or stored goods, unless the testimony proves positively that the owner of the goods intended to limit the carrier's or warehouseman's liability.

Consider, for example, *French v. Rekins Moving & Storage Co.* (195 Pac., 2d, 968), where certain stored goods were lost by the warehouseman during transportation, and the owner (French) sued for full value of the missing goods.

During the trial the warehouseman proved that when the goods were accepted French signed a printed receipt which included a clause in which French "agreed" that the valuation of the goods was not over 10c. per pound, and limited the warehouseman's liability to that amount.

French testified he didn't read this receipt and that the truck driver didn't direct his attention to the limitation, also that he "assumed" he was merely signing an "ordinary receipt."

In view of this testimony the higher court held the warehouseman must pay French the full value of the missing goods, and said:

"In the case before us, the warehouseman had knowledge that the contents of the barrels were of far greater value than the nominal valuation recited. There was no fair agreement between the parties as to the limited and nominal valuation declared. This arbitrary limitation, therefore, was not binding on the bailor (French)."

The real and basic reason for the above-explained law is that long ago the courts adopted a universal rule that no person, firm, or corporation can, by contract or otherwise, avoid ordinary responsibility and liability for injuries to persons or property. This is so whether the contract relates to injuries to employees, customers, invitees, or other persons, or loss or damage to shipped, bailed, or stored merchandise.

Another reason is that the Uniform Warehouse Receipts Act provides that warehousemen cannot insert in a receipt issued by him any conditions which in "any wise impair his obligation to exercise that degree of care in the safe-keeping of the goods intrusted to him which a reasonably careful man would exercise in regard to similar goods of his own."

Rejected-Shipment Trouble

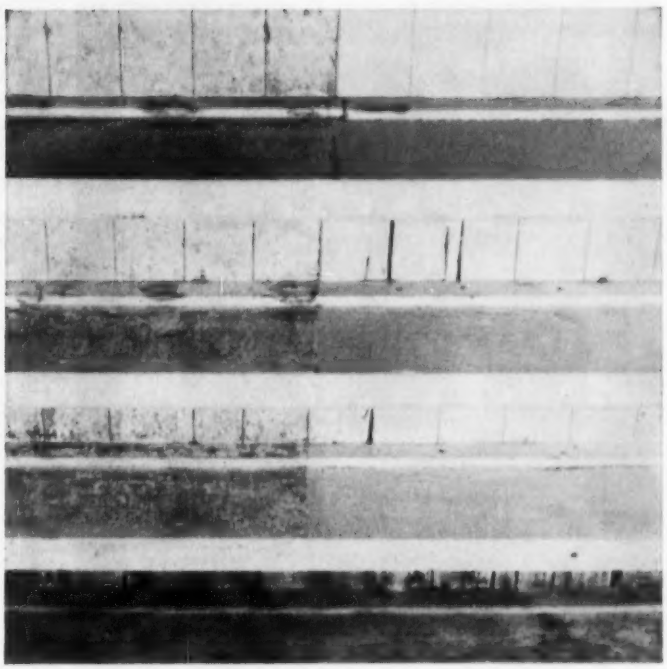
As for a consignee rejecting a shipment of perishable merchandise merely with the *statement* that it was "spoiled," a high court has now declared that this "evidence" is not sufficient to hold the carrier liable.

In *Wheelock Brothers, Inc. v. Lindner Packing & Provision Co.* (273 Pac., 2nd, 730) a shipper had deliv-

NEW DU PONT ODORLESS MILDEW-RESISTANT ENAMEL

solves mildew problem in hundreds of food plants

Food-plant managers across the country have found that Du Pont Odorless Mildew-Resistant Enamel Oyster White retards the growth of most types of mildew on walls and ceilings. Formulated with solubilized copper-8-quinolinolate fungicide, Du Pont Mildew-Resistant Enamel is especially suitable for meat-packing plants, poultry and cheese plants, creameries and other areas where mildew presents a major problem. Tests prove that in most types of food processing plants it effectively retards mildew formation for months . . . eliminates the need for constant cleaning and scrubbing. And Du Pont Mildew-Resistant Enamel resists chipping and cracking . . . stays bright-looking month after month. What's more, when you consider the expense of constant cleaning, you'll realize just how economical this superior maintenance finish is. Mail the coupon today for complete information.



Photograph shows section of beamed ceiling in food-processing plant after three years' exposure. Lower strip: cleaned but left unpainted. Upper left: painted with ordinary non-fungicide enamel. Upper right: painted with Du Pont Mildew-Resistant Enamel.

Check these important advantages:

- ✓ **Effectively retards most types of mildew**
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Gentlemen:
Please send me, without obligation, free literature on how to combat mildew.

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Reg. U.S. Pat. Off.

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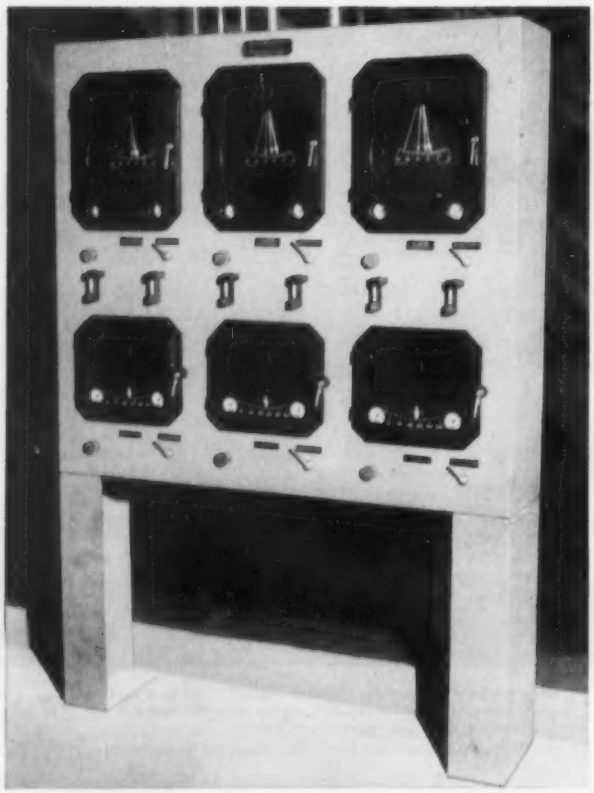
PAINTS

Chemically engineered to do the job better

For more information, use coupon on last page.

Read what Davis Canning Co. thinks about its Taylor Vacuum Pan Control System!

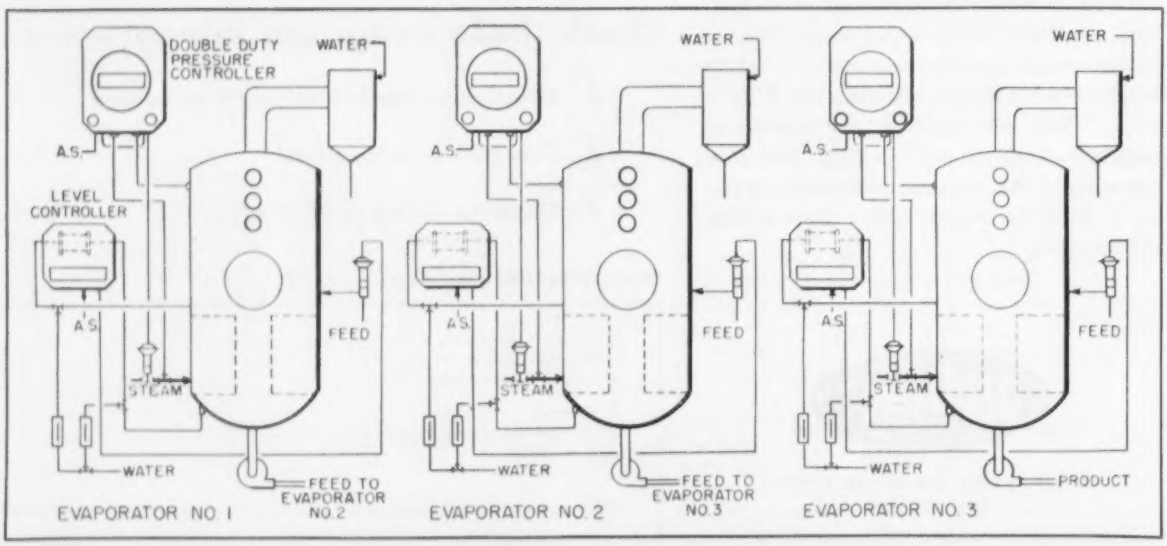


"THE APPLICATION of automatic control to these vacuum pans has increased our overall efficiency. We get a more consistently uniform product and the vacuum pans do not require the constant attention of an operator as they did before the control was installed", says Mr. Parker, plant manager at the Davis Canning Company, Atwater, California.

The controls Mr. Parker refers to are installed on their three single effect evaporators which are run in series. The Taylor system, unique for tomato processing, controls the level in each effect and regulates the pressure in each evaporator body. The pressure over-ride feature prevents excessive burn-on in the tubes. Pictured at left is the panel board, showing the three Liquid Level Controllers and the Double Duty Pressure Controllers. Drawing below shows the instrumentation hook-up.

When your business reputation depends on uniformly high product quality, and your profit margin demands the utmost efficiency, you need dependable automatic controls. Why not call *your* Taylor Field Engineer today? Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.



Taylor Instruments MEAN ACCURACY FIRST

ered 573 boxes of frozen, cooked meats to a common interstate carrier. The bill of lading was marked "Perishable —Keep Frozen," and the shipment was placed in a refrigerated truck. Then on arrival at destination, 62 boxes of bologna, 80 of salami, and 9 of franks were rejected by consignee.

Thereupon, this shipment was temporarily stored in a warehouse. And later, the shipper sold the turned-down goods at a loss of $1,366.55, then sued the carrier for this amount, claiming that the rejection by the consignee was for improper refrigeration due to negligence of the carrier.

Only evidence as to why the shipment was rejected came from the consignee, who testified that after it had been shipped he had information that the truck carrying the shipment had not had low enough temperature, and hence part of the meat was soft.

Here, it is interesting to observe that the high court refused to hold the carrier liable. It explained that the evidence was insufficient to show that the meat actually was spoiled on delivery to the consignee.

Case of the Elusive Receipts

Further in the warehouse field, one who loans money on negotiable warehouse receipts may recover payment, although the borrower has no interest or ownership in the receipts. So pronounced a recent high court.

Thus, *Gould v. City Bank & Trust Co.* (213 Fed. Rep., 2nd, 314), concerned a situation where certain negotiable warehouse receipts were pledged as security for a loan represented by a note. The owners of the receipts paid the note. But the lender failed to return the receipts.

Then without authority of the owner, the lender again pledged the receipts as security for money borrowed from City Bank & Trust.

The court held that the bank must be paid before the owner could recover possession of the receipts, saying:

"The purpose of the Uniform Warehouse Receipts Act would be largely frustrated if the courts were to hold the negotiability of warehouse receipts to be limited by the old common-law rules relating to the sale or pledge of property."

That Sick-Consumer Question

A question always getting sharp attention is this type: "When a retailer

(*Turn to page 207*)

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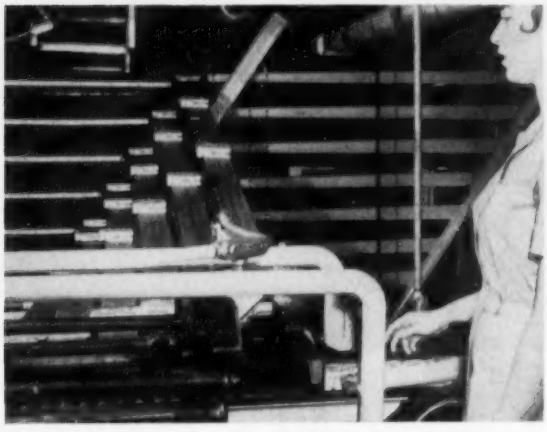
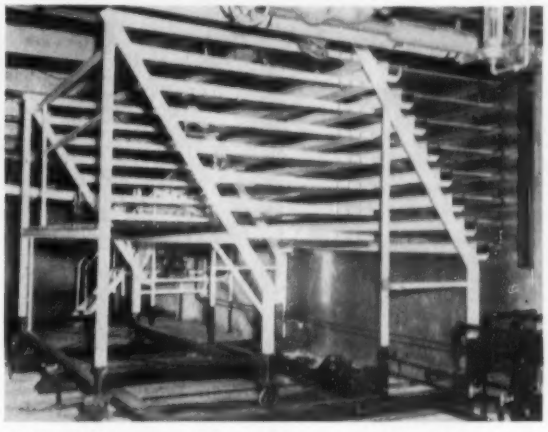


PACKAGES travel from wrapper to accumulator and are positioned on roller feed by eight inclined belts.



HYDRAULIC chariot feeds freezer through ports in unit (designed by V. C. Patterson, built by Oliver Corp.).

Freezes Packages Non-Stop—150 a Minute

Automatic 8-level plate unit features ingenious "chariot" feed

HIGH-SPEED, low-cost handling—from wrapper, through freezer, to caser—has become a reality with the new compact unit employed at Shoreland Freezers, Inc., Salisbury, Md.

A continuous production rate of 9,000 packages per hour —150 a minute—is achieved.

Coupled with a unique, eight-belt feed system and discharge, this self-loading plate freezer has cut labor, reduced power costs, and upped quality with its short, 1½-hr., freezing cycle.

Here's how it works. Retail-size packages leave the carton-wrapper and enter an accumulator by belt. Groups of eight packages trip a limit switch and eject individually onto eight pitched belts leading to separate levels of a loading chariot.

When 35 packages have been positioned on each of the eight levels, plates open up and the 280 packages are pushed into the freezer by the hydraulic chariot. At the same time, an equal number of frozen packages are ejected from the far end of the freezer. These are converged from eight lines to four, then enter a four-level, automatic caser.

Top plates in the freezing unit are stationary. Bottom plates are attached to a common frame that is supported by four wheels operating on cam tracks. Forward movement of these wheels opens the plates. Packages are prevented from moving back when the plates close by a curbed holding plate at the entrance.

Frosting of the 8,000 sq. ft. of plate surface is reduced, since flap-type ports minimize entrance of warm air. Moreover, movement of the packages over the plates tends to inhibit frost formation.

BACK IN THE 1890's

WHEN JOHN PHILIP SOUSA WAS LEADER OF THE MARINE BAND

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

High pressure mixing vessel

Specialists In

STAINLESS STEEL
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As far back as the days when Sousa's stirring marches first set millions of feet a-tapping, KOVEN-built equipment was already at the service of American food manufacturers — helping them achieve cost-cutting efficiency and faster production. KOVEN's know-how has grown with the years — and today, more than ever, leaders in the food industry depend on KOVEN Individualized Equipment to meet the challenge of increasingly specialized operations. Why? Because each dependable KOVEN unit is tailored to fit a specific need . . . thus eliminating slow-downs and assuring economical production. Call or write for a consultation — no obligation. Send for Bulletin #550.

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KOVEN equipment in all metals and alloys includes: High pressure vessels, extractors, mixers, stills, kettles, tanks, stacks, breechings. Shop and field erected storage tanks. High vacuum testing.

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KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

DEEP DIGGING into processing questions marked "working-baker" sessions at ASBE.

Bakers Sift New Techniques

Gage progress and problems of ferment process . . . Spotlight practical points on freezing and packaging . . . Detail use of "hot" flour

BECAUSE of their growing importance in the bakery field, brew ferments, frozen goods, and mechanization were leading subjects of three sessions at the 31st annual meeting of the American Society of Bakery Engineers in Chicago, Mar. 7-10.

FERMENTS

Although introduced in commercial bakeries fully a year ago, the brew ferment process, designed to replace sponge work in bread making, is not yet free of "bugs."

But L. F. Marnett, of C. J. Patterson Co., Kansas City, Mo., declared that there is no reason why this process can't prove out in producing top-quality breads, provided adequate control measures are taken.

In comparing the qualities of ferment breads with those made conventionally, in six scattered test markets, he found, on an average, that regular loaves scored higher (86.3) than ferment (82.3). In four areas, regular loaves scored above and, in two, scores of regular and ferment loaves were about the same.

Often turning up in ferment-made loaves were off-odors. These were described as sharp and sour and possibly traceable to improperly prepared ferments.

Suggestions made for handling ferment doughs were: (1) Increase the time to mix, (2) extend floor time of doughs to 30-35 min., (3) add mono- or di-glycerides to check foamy doughs, and (4) introduce fungal enzymes to overcome "bucky" doughs that don't run efficiently through make-up machines.

Twenty-two varieties of baked items (breads, doughnuts, sweet goods, etc.) were successfully produced from the same brew formula, it was pointed out by C. Scarborough, Borden Co., Gatlinburg, Tenn. Only variation, he said, was in amount of ferment, which was changed in relation to flour content. And in no instance had he recalled a ferment dough being lost.

Four different types of ferments are now in use: (1) That having 2% non-fat milk solids in the brew as a buffer, and an additional 2% non-fat milk solids on the dough side, along with oxidants; (2) that employing 6% non-fat milk solids in brew as buffer, and no oxidant in dough; (3) that with chemicals in brew as a buffering agent, and all of non-fat milk solids on the dough side; and (4) that using 5% of a weak protein flour instead of sugar in brew, plus a chemical buffering agent, and all of milk on the dough side.

Short-time ferments (2½ hr. instead of 6) that are chilled to 50 deg. F., and suitable for making variety goods, were mentioned by Mr. Scarborough. And he went on to tell of satisfactory results in test-use of powdered and concentrated ferments.

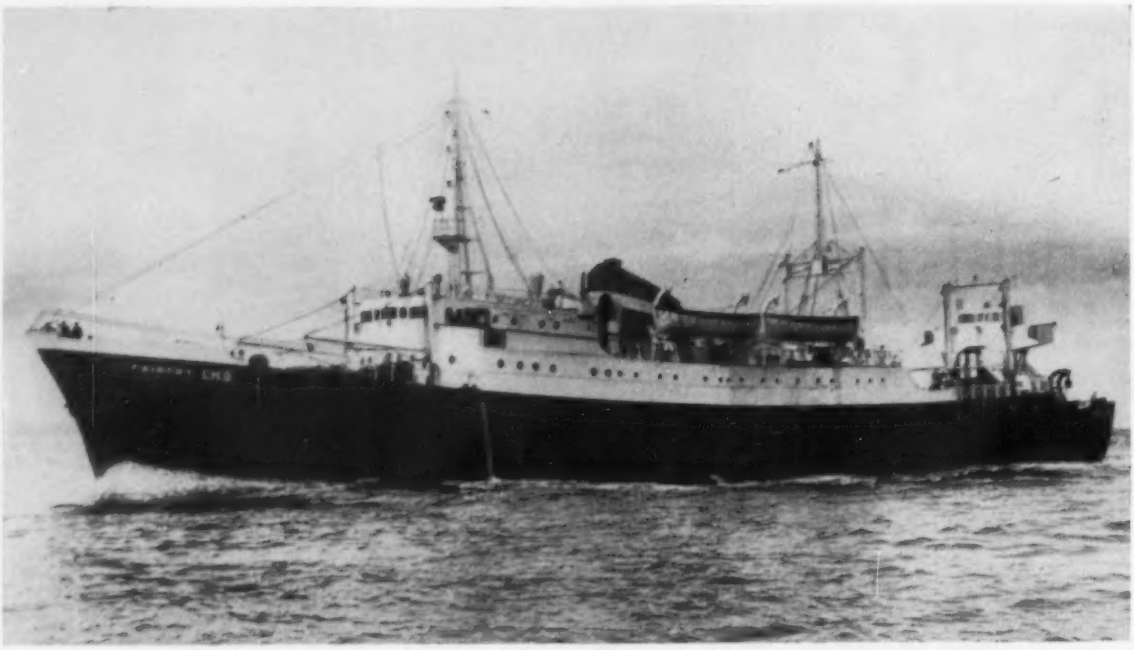
Four Benefits

Cited by R. C. Choi, American Dry Milk Institute, Chicago, were these advantages of the ferment process: (1) Elimination of the old setting up of individual sponges as a short-cut to speedier operations, (2) slashing of 4½ to 5 hr. in processing time from mixer to dough divider, (3) reducing of floor space as much as 25%, and (4) cutting of labor costs.

Recommended for the "no-time" fermentation process was a brew consisting of: Water, 70 parts; sugar, 15; yeast, 1½; yeast food, ½; salt, 1½; malt, 0.4; and non-fat milk solids, 6. Batch is fermented 6 hr. at 95-110 F.

To make the dough: Water, 70 parts; ferment, 80; yeast, 1; sugar, 6; and shortening, 3. Dough is mixed

(Turn to page 117)



STREAMLINED DIESEL "FAIRTRY" can cruise fully 80 days—with no worry over "deck-life" of fish, since they are immediately packaged and frozen. Echo-sounder (40-to-400-fathom ranges) locates schools of fish. Vessel's engines are amidship, freeing stern for complete processing deck, along with enclosed trawl bridge for "working" navigation. Owner and operator is C. Salveson & Co., Leith, Scotland.

"Catch-and-Process" Trawler

—boasts latest equipment for filleting and freezing fish "directly out of the net." Thus brings home top-value cargoes of sea-fresh products—all packaged. Meal and oil from wastes, too

JOHN KERR
Staff Member, Scottish "Daily Express"

By virtue of its special design, incorporating advanced preparing-and-freezing facilities, Britain's new sleek fishing trawler *Fairtry*—latest ship to combine catching and processing on the high seas—is setting notable marks . . .

More than 600 tons of fillets are processed and frozen on each of its 2½-month trips from the Isles to Greenland or the Newfoundland Banks.

In addition, 100 tons of fish meal and about 20 tons of fish liver oil are being prepared from the wastes. These figures represent a total catch of some 1,500 tons.

Built in Aberdeen, the *Fairtry* displaces 2,600 tons and measures 245 ft. Unlike side-trawl vessels, her trawl operates from the stern. When it is hauled aboard, fish are spilled out on an open work-deck. They then pass through hydraulically controlled hatches and slide down a chute to extruded aluminum pounds, located at the after end of the processing deck.

Personnel then divide the catch into "roughs" and quality fish. The former are gutted, hand-filleted, and frozen (or are frozen whole). The latter—cod, haddock, and coal fish—are gutted and sent through the main, mechanized factory line.

On the mechanical line, fish are first placed in slots on a circular cutter. Here they are guillotined at the rate of 28 fish per minute. Bodies are ejected and travel tail first into an adjoining filleting machine. Resulting product travels up conveyor belts to be de-finned, trimmed, and if necessary, skinned by machinery.

Fillets are weighed in 7-lb. lots on scales specially designed to give accuracy on a rolling ship. Lots are wrapped in vapor-proof wax paper.

Freezing Steps

Wrapped packages are then placed in trays, which are loaded into racks. These are pushed into one of six quick freezers—arranged in two batteries—where fillets remain for 2½ hr.

After removal from freezer, fillet packages are spray-glazed—given a protective coating of ice.

Eight packages make up a carton, which is bound with wire and sent by conveyor or spiral chute to one of two insulated storage holds. These holds are kept at −10 deg F. Fish frozen whole are stored in 60 lb. bags.

Three 150-hp. compressors can deep freeze 40 tons of fish per 24-hr. period. The 57,000 cu. ft. of storage space is maintained at proper temperature by a 48-hp. compressor. (*Turn to p.* 117)

MERCK INGREDIENTS IMPROVE FOOD PRODUCTS

Pint-sized gourmets really go for margarine that is fortified with MERCK VITAMIN A. Even control chemists are impressed with the light color, consistent stability, and absence of off-odors of this superior product.

Discriminating shoppers reach for frozen peaches protected by MERCK ASCORBIC ACID. This anti-oxidant prevents browning and keeps flavor fresh —boosts consumer acceptance by licking the problems that face many frozen food processors.

This butcher moves his sausage products faster because they look more appetizing. Their better, longer lasting cure-color is due to CEBICURE* or CEBITATE,* Merck's ascorbic acid and sodium ascorbate designed for the meat industry.

Sales-wise and cost-conscious bottlers know that MERCK *Anhydrous* CITRIC ACID sparks up flavor and keeps costs down. They also know that fortification with MERCK ASCORBIC ACID promotes sales, and in many cases, protects flavor too.

Research and Production
for the Nation's Health

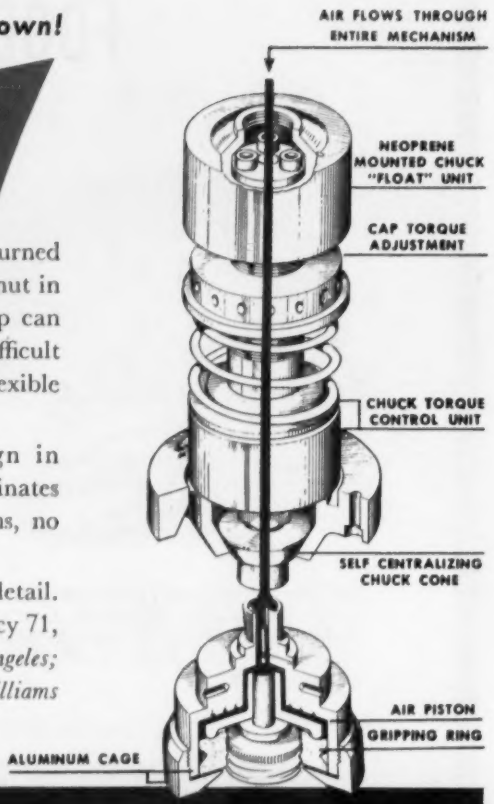
MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

*Trade-mark.

For more information, use coupon on last page.

Finicky Caps Fitted
automatically...

and fed with the gentlest action known!

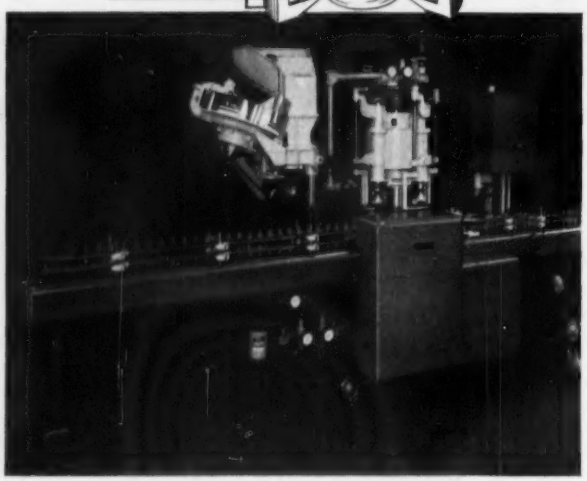


PNEUMACAP

Gently "squeezed" and turned by the air activated neoprene doughnut in PNEUMACAP's new air chuck, the most delicate cap can meet no harm. What's more, cap variations and difficult designs are handled in stride with this remarkably flexible chuck. Adjustment is automatic!

Teaming up with advanced cap turning design in PNEUMACAP is the Sterling Cap Feeder which eliminates all "churning" action, delivers caps on call. NO jams, no breakage—no baskets required to catch unused caps.

Write for Bulletin No. 128 and get the story in full detail. PNEUMATIC SCALE CORP., LTD., 91 Newport Ave., Quincy 71, Mass. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*



"Sterling Feeder at left handles caps up to 89 millimeter diameter. Another model is available for sizes up to 33 millimeter, as shown on Pneumacap-Four machine pictured above."

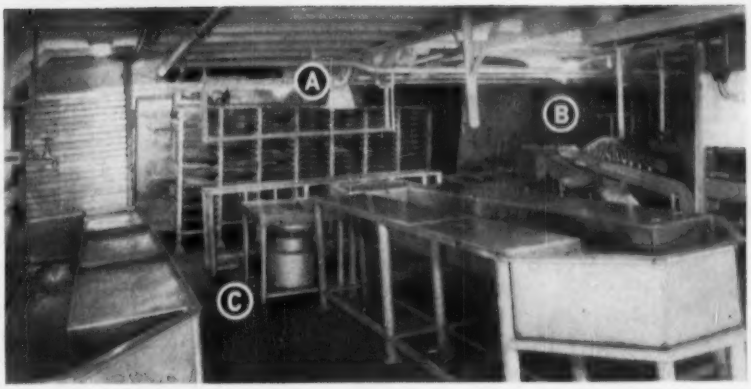
★PNEUMATIC

Packaging and Bottling Equipment

See Pneumatic's Pneumacap Eight,
AMA Packaging Exposition, Chicago, April 18-21.

For more information, use coupon on last page.

SANITARY layout features construction in this processing room. Quick-freeze units are located back of tray racks (A). Trimming and filleting machines (B) are arranged for easy flow of product to weighing and packaging tables (C).

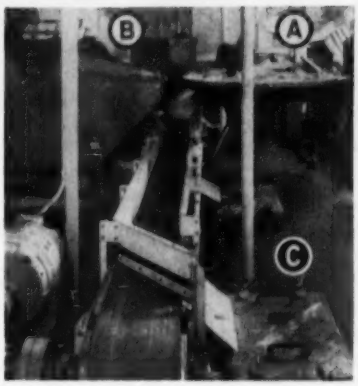


High sanitary standards are maintained. Handling is reduced to a minimum, and fish are washed or sprayed almost continuously between the pounds and the weighing tables. There are no crevices or corners on the stainless steel filleting tables. So bacterial growth is curbed.

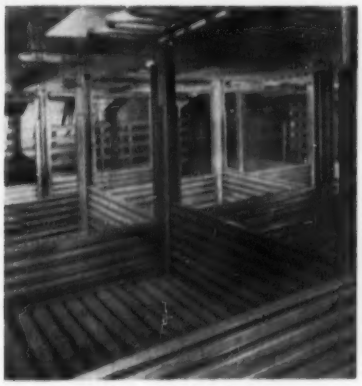
Bones and offal from the filleting plant are carried by conveyor to one of four hoppers located below the processing deck. These hoppers, each having a capacity of 1,780 lb., discharge directly into rotary, steam-jacketed concentrators. Eight to 10 hr. are required to dry the waste. Extracted moisture is removed by multivane exhaust fans.

Dried waste is emptied from the concentrators to a grinder-hopper located on the next deck below. After grinding, the meal is blown to a bagging-off cyclone, equipped with filters to catch fines.

Oil operations: The liver-boiling plant, where fish oil is extracted, includes a special tank for washing the oil. Stored in holding tanks, the 5,000 gal. of oil can be pumped ashore in less than 1 hr.



FISH move from pounds to decaptor (A). Filleting machines (B) discharge waste by belt through deck hatches (C).



PACKAGED PRODUCT is stored in these compartments. Aluminum sideplates prevent shifting of cargo. Note overhead refrigerating coils.

● ● ●

Bakers Sift New Techniques

—*Continued from page 113*

15-17 min., given a 30-min. floor time, and proofed for 60 min.

Estimates, to date, were that about five large-size and 30 small bakeries are employing the ferment process.

FROZEN GOODS

Feeling was expressed that bakers have been taking a back seat in the production of frozen goods, letting others invade their domain. Cited was the huge volume of frozen pies made outside of the bakery field. Carrying the ball on promotion and distribution have been the poultry and fruit packers. Bakers now feel that they must assume the initiative.

A survey of 300 housewives reported by Del Pratt, Omar, Inc., Omaha, indicated that 84% serve their own pies and the rest serve bakery pies. Further figures: 48% serve pies once a week, 12% twice a week, 12% twice a month, and 28% once a month.

Another survey showed an 80% preference for frozen unbaked pies as against baked. As to how often these housewives purchase frozen, unbaked pies: 19% buy once a week, 3% twice a week, 28% twice a month, 35% once a month, and 15% never.

Production of frozen pies can be carried out in a continuous operation, and without the need of baking. Too, with adequate freezer-storage facilities, frozen unbaked pies can be stockpiled as a production-control aid.

Fruit pies do not freeze well after baking. Tests on defrosting frozen pies with infra-red lamps shows promise. But unless frozen pies are flash-defrosted, the filling breaks down and the crust becomes soggy.

Most important frozen pie-filling ingredient, continued Del Pratt, is the stabilizer. Welcome additions as pie-filling stabilizers are the newer gums and starches, and carboxymethylcellulose (CMC).

Recommended is addition of 1 part CMC to 8 parts of clear boiling starch (modified corn or waxy maize).

Pie-freezing tests—in a 16-20 deg. F. range—indicated fastest freezing (2 hr.) when unboxed pies, stacked on pallets, were held in a −12 deg. F. room with air circulation.

But when there was no circulation in the freezer, the same pies took 3¾ hr. to freeze to the 16-20 F. range. Boxed pies, stacked on pallets, froze after 5 hr. in the −12 F. room with air circulation. But it required 10 hr. for efficient freezing of these same pies when there was no air circulation.

Commercial baking of frozen pies presents a problem. Suggested is very careful defrosting of pies to avoid condensation of moisture on top crust. Unless temperature and humidity are controlled so that pies are above the

(*Turn to page 159*)

In Behalf of Progress . . .

War Warnings Point Up Need for Food Defense

Build some sort of underground shelter right now and stock it with food and water to last five or six days.

Coupled with other official warnings, this bit of advice by Civil Defense Administrator Val Peterson certainly puts the nation on the atomic alert.

So it comes as timely news that National Research Council has established an FDA Civil Defense Foods Advisory Committee. Created at the request of the Food & Drug Administration, this committee will study the vulnerability of the food manufacturing and warehousing industry to open attack or sabotage by biological, chemical, or radiological agents.

And the committee also will be concerned with methods and facilities for sanitizing and decontaminating food factories, equipment, and products in a civil defense emergency.

Headed by Roy C. Newton, Swift's vice-president of research, the committee is composed primarily of food industry men, each of high technical caliber.

FDA and National Research Council are to be complimented for setting up such an agency. And everyone concerned with food manufacturing and warehousing better get his head out of the sands of complacency, too. Our industry has been whistling at the potential graveyard of modern warfare too long. An adequate and safe supply of food cannot be taken for granted in another World War.

We in this country are too much in the habit of thinking that food will always be at hand when we get hungry.

It is to be assumed that all those who direct the operations of food factories have taken the precautions against open nuclear attack recommended by civil defense authorities. And that any new instructions based upon H-bomb fall-out hazards will be followed immediately.

But when it comes to sabotage, most food plant executives and technical personnel haven't given the matter a first thought. Yet our industry is said to have more than its share of "reds" and "pinks" among its employees.

It would not be difficult for one employee to put a key piece of machinery out of operation. And it would be even easier for him to contaminate raw materials or finished products with the silent anti-personnel weapons of the enemy—and so effective.

It goes without saying that all supervisory personnel should be loyal Americans, and that they must be alert to possible acts of sabotage in an international emergency.

Furthermore, the director of quality control should have a checklist of all points at which raw material or product can be contaminated. And he ought to figure out testing techniques to spot contamination. Perhaps a Geiger counter would detect radiation. While heavy doses of bacteria or chemicals might be spotted by animal feeding tests. These are matters to be checked with the FDA.

There is much reason to hope that the very awfulness of modern instruments of mass slaughter will prevent a major war. But preparedness is better than wishful thinking.

In these times, preparedness could be worth a world of cure.

Transfer Restaurant Processing to Your Plant

Food buying by restaurants and institutions totals a tidy $7.2 billion a year. And by 1975 the figure is expected to reach $16 billions, according to Harold H. Jaeger, of Can Manufacturers Institute.

As Mr. Jaeger pointed out at the canners' convention, this is a first-rate market. Yet some food manufacturers seem not to appreciate its significance—at least not to the extent of making a special effort to meet the requirements of that market.

Frozen food packers have perhaps been the most alert segment of the industry in respect to restaurant and institutional requirements and opportunities. They have well established the reputation of their products for convenience, taste, and eye appeal in that market.

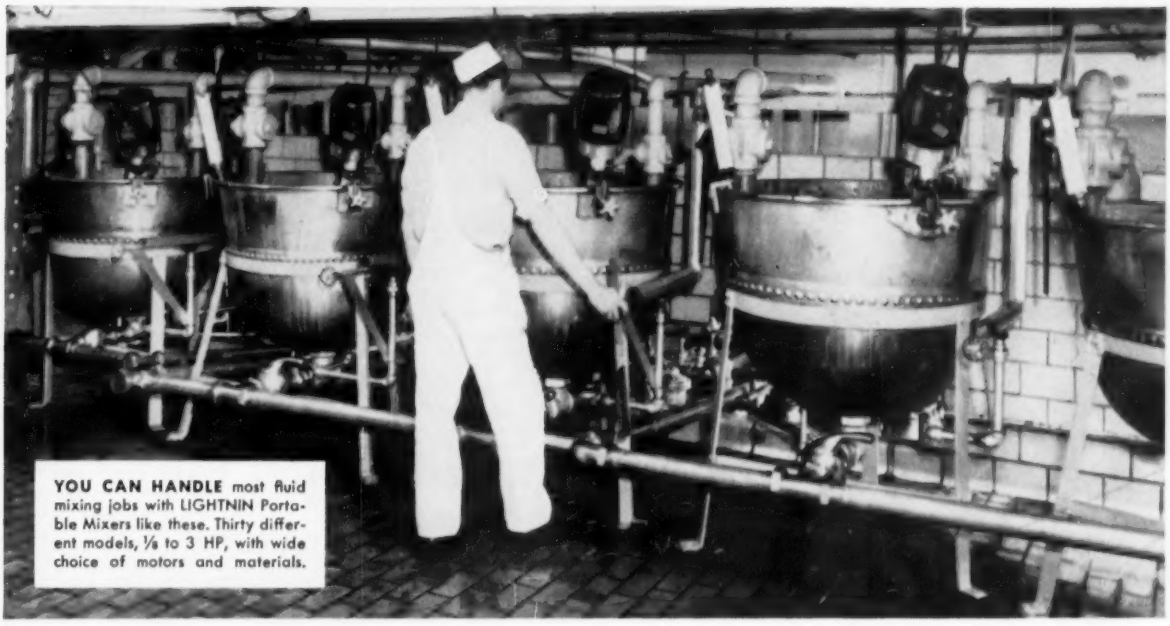
Canners, of course, have long done a big business in this area, particularly with products in No. 10 tins. In fact, canners get 35% of the fruit and vegetable purchases, against 19% for frozen products. But the canners aren't happy, because the biggest share, 46%, goes to fresh fruits and vegetables.

For years, restaurant and institutional food buyers have been yelling for help from food manufacturers. They want more of the restaurant's food processing work done by the commercial processor.

One reason is the obvious one of cutting labor costs. Others are to reduce waste, save time, and improve control over portion size and inventory.

After shying away from the task for years, some meat packers are producing easy-to-prepare individual portions for restaurants. So also are fish and seafood packers. One New York processor makes nothing but dehydrated soup mix for institutions. Time-saving instant offee is gaining a foothold. And preserves are put up in one-serving containers.

These are signs of the times. There's business to be had by performing in your plant the work now done by restaurant cooks.



YOU CAN HANDLE most fluid mixing jobs with LIGHTNIN Portable Mixers like these. Thirty different models, ⅛ to 3 HP, with wide choice of motors and materials.

Easy way *to solve any fluid mixing problem*

How to get fast service, guaranteed results

Every fluid mixing job is different, but you can handle *all* of yours this fast, simple way:

1. Call your LIGHTNIN Mixer representative. Or, if you don't have his name, write or phone us direct.
2. Tell us what you want to mix.
3. We'll give you *guaranteed* mixing results.

You can get LIGHTNIN Mixers, constructed in metals of your choice, to mix fluids in any quantity, practically any viscosity, in open or closed vessels of any size and shape.

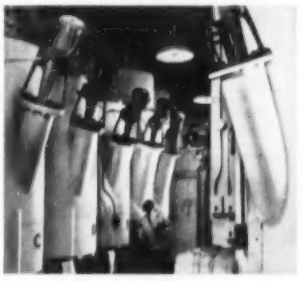
No risk; here's why. Thousands of LIGHTNINS are in use; hundreds have been in service 20 years and more. Every LIGHTNIN Mixer you buy is unconditionally guaranteed to do the job for which it is recommended.

When you mix with LIGHTNINS, you save by cutting engineering time and cost to a minimum. And you eliminate "trial-and-error" mixing, for good.

Get the answer TODAY. On almost any food mixing operation, you can have a guaranteed LIGHTNIN recommendation and firm price *by phone*—without waiting. (If you prefer to write, you'll have facts by return mail.)

This MIXCO service costs not a penny—can save you plenty. Why not take advantage of it—today?

HYDROGENATION, stripping, and other big mixing jobs are handled rapidly with turbine-type LIGHTNIN Mixers. Hundreds of power-speed combinations. For open or closed tanks. Sizes 1 to 500 HP.



USING SPECIAL TANKS? You can get LIGHTNIN Mixers to fit them. Propeller-type LIGHTNINs like these come in sizes from ¼ to 3 HP, for open or closed tanks; many modifications.

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Get these helpful facts on mixing: cost-cutting ideas on mixer selection; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Free—no obligation. Just check data you want, tear out and mail to us today with your name and company address.

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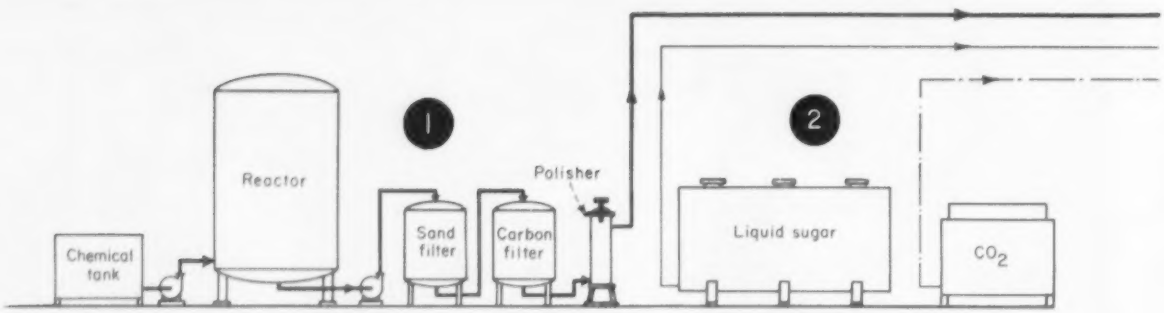


Front-Running Canned Pop Plant

California Facility Is Specially Designed to Handle Flat-Top Cans . . . Has 12-Million-Case Annual Capacity

ENGINEERED to put through 30,000 cases of canned product a day, Can-A-Pop Beverage Co.'s 75,000-sq.-ft., plant at Compton, Calif., is called the largest soft drink cannery.

Costing $1,250,000, it is designed specifically for flat-top containers, with two high-speed filling lines and eight packaging lines.

First step in the processing operation is treating the city water to remove alkalis, chlorine, and undesirable minerals—Point 1 in flowsheet. The water passes from a Western chemical filter to a settling tank of 30,000-gal. capacity.

From here, an average of 8,000 gal. hourly is pumped through three filters—a sand and gravel unit that removes sediment and precipitates, an activated carbon filter that takes out chlorine and odors, and an Alsop polisher employing cloth and filter papers—to the syrup room, filler, and Clayton package boiler.

Flavor Preparation

In the 40x40 ft. tile-floored ultra-violet sterilized syrup room are prepared the five flavored syrups—cola, black cherry, root beer, grape, and orange soda. Batches are made in four 3,300-gal. tanks equipped with horizontal, stainless steel agitators driven by 3 hp. motors.

Manifolded to these tanks is a 100-gal. stainless extract vat equipped with a pressurizing injector (to exclude air). It is supplied from three 100-gal. flavor tanks in which citric acid, sodium benzoate, and flavors (in amounts needed for one 3,300 gal. batch of syrup) are mixed.

Liquid sugar is pumped from a 25,000-gal. storage tank located in the warehouse and metered directly to the syrup mixing tanks. Treated water is also metered to these tanks. Finished syrup is pumped to the fillers through stainless steel lines.

Cans by Freight Cars

The plastic-lined, flat-top, 12-oz. cans (24 and 48 per carton) arrive by rail and are moved straight to unscramblers, where they are dumped from the cartons.

Cans are elevated (720-800 per min.) to a cable conveyor hung below the ceiling. Empty cartons are belt-conveyed to the casing stations.

Cans then go through an 8-ft.-long steam and water sterilizer—Point 4—are turned on their sides to facilitate drainage of condensate. Then they enter a 30-ft. tunnel lined with ultra-violet lamps to insure sterility. Leaving here they move to the 20-spout Liquid Carbonic syruper, where stainless injectors deliver measured amounts of syrup to each can.

Next comes the 60-spout filler, which is integrated with the syruper. Here carbonated water is added to complete the fill. Extra CO_2 gas is jetted in the headspace of each can moving on track to the 360 can/min. seamer.

Source of CO_2 for this operation, as well as for the carbonators, is a 6-ton liquid storage tank in the warehouse. This unit is equipped with both refrigeration and heating facilities. If pressure in it exceeds 300 psi., the refrigeration unit automatically cuts in, cooling the liquid and reducing the pressure. Should it fall below 250 psi., heat is applied. This insures a uniform pressure of 250-300 psi. at all times.

Canned product goes from seamer to a re-heater, where hot water is sprayed on it to increase contents temperature and thus prevent condensate on can surfaces. Cans then get a blast of compressed air to remove residual water and completely dry them.

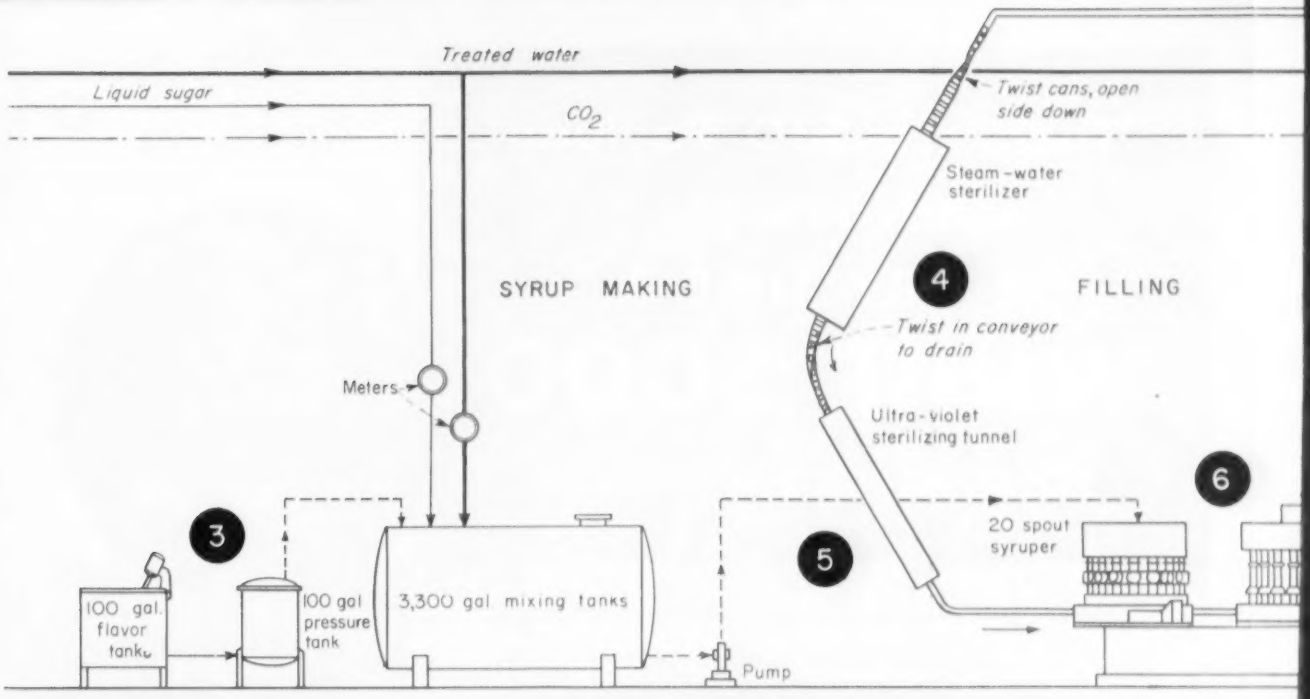
Packaging Steps

Following coding, cans move through a FMC weigher that ejects underweight ones. Then they go to the eight packaging lines. Six of these are equipped with Decam Corp., (Charlotte, N. C.) 6-Pak units, which assemble and package cans in a "take home" carton. In these units flat chipboard blanks pass over a roller that applies glue to one of the bottom flap edges. Then, as the carton is formed, 6 cans are elevated into it. Bottoms are folded and sealed. Cartons are accumulated and cased automatically, in 24- and 48-can containers.

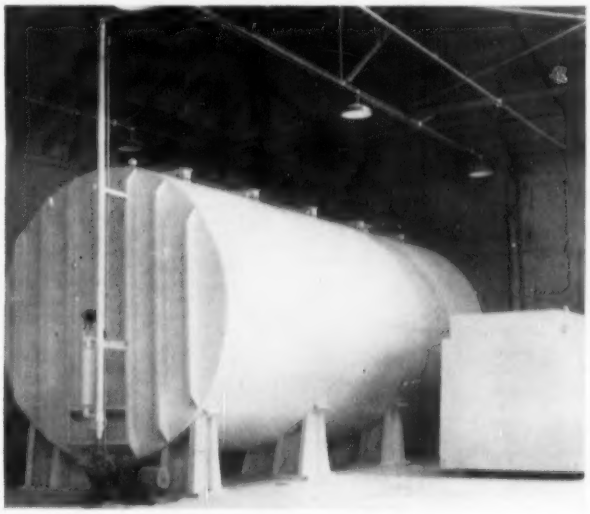
The other two packaging lines are used for "loose can" 24 (standard) and 48-can cases. Filled cases move to Standard-Knapp gluing-sealing units, then are palletized for easy handling in storage and delivery.

FOOD ENGINEERING April 1955 Pages 120-123

Overhead cable conveyor



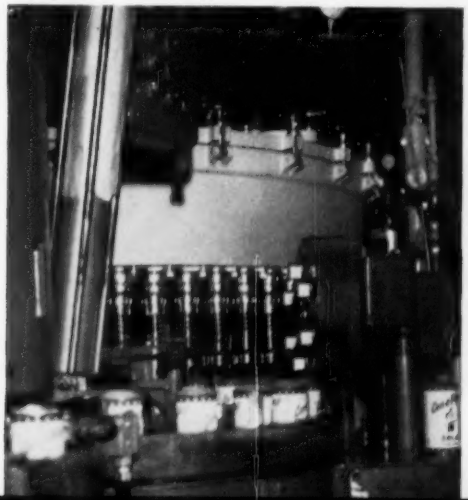
1 **WATER** is treated in large tank (rear), filtered through gravel, carbon (foreground).



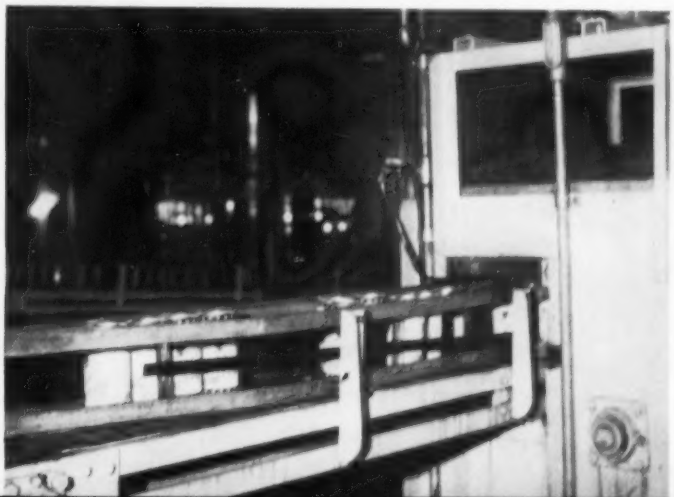
2 **LIQUID SUGAR** is stored in tank (left), liquid CO_2 in temperature-controlled unit (right).

3 **SYRUP ROO** ground) trans

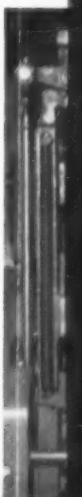
7 **EXTRA CO_2** is jetted in headspace of cans right as they move to seamer (left).



8 **RE-HEATER** sprays hot water on cans to raise temperature of contents, prevent sweating in storage.

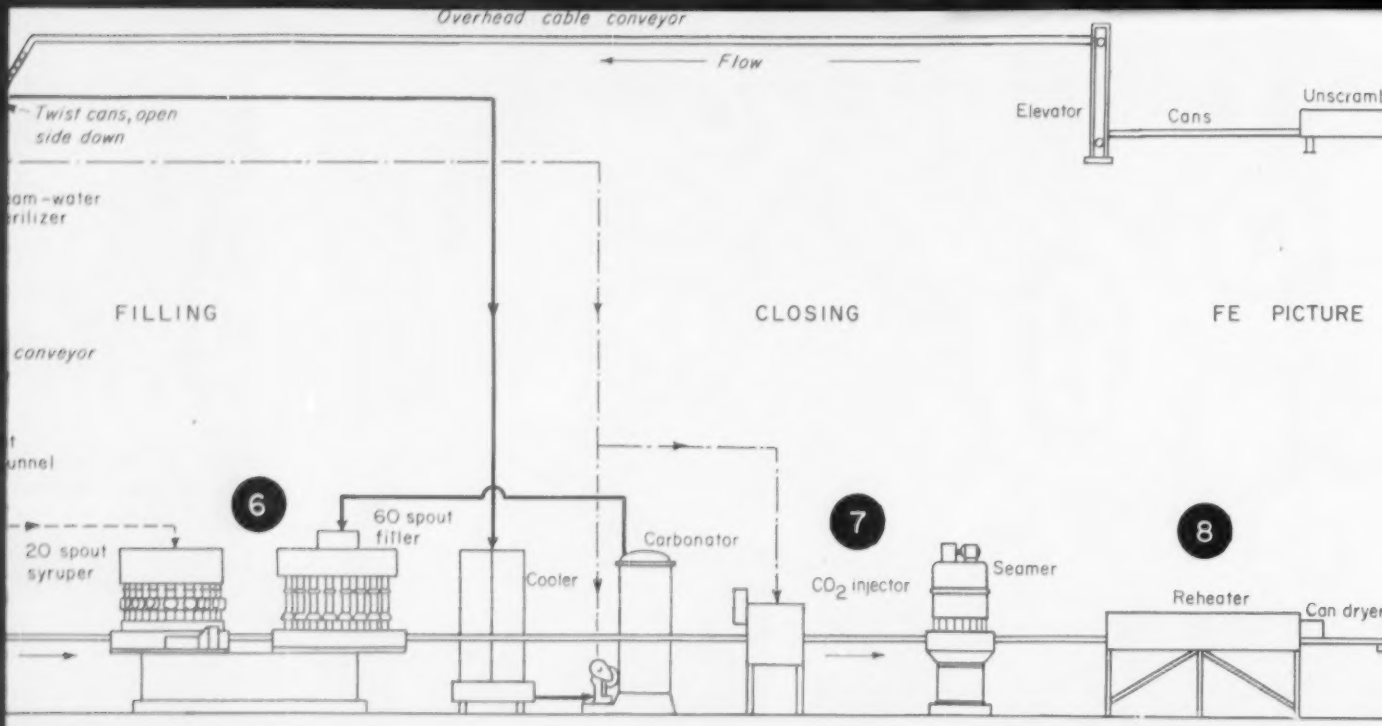


9 **PAC** 6, fo

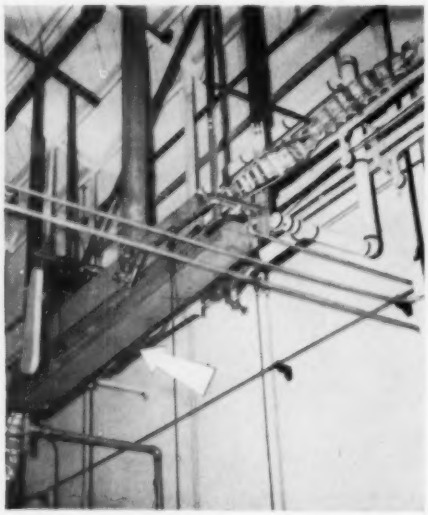


Cans from R.R. Car

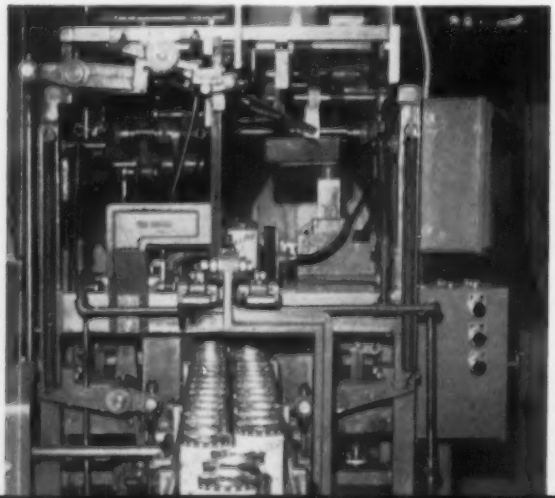
LEGEND



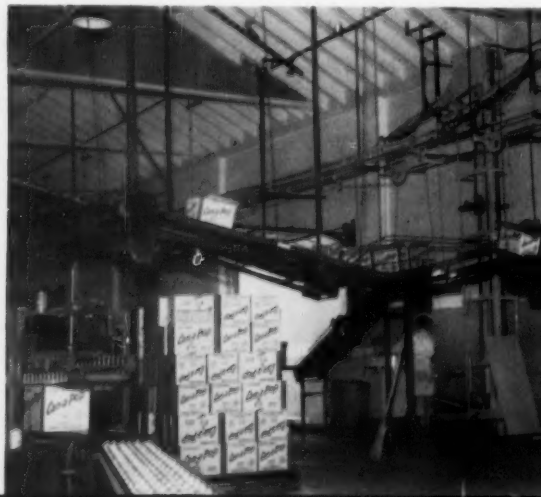
3 **SYRUP ROOM** has tile floor, ultra-violet lamps. Pressure tank (foreground) transfers flavors to syrup tanks (rear).



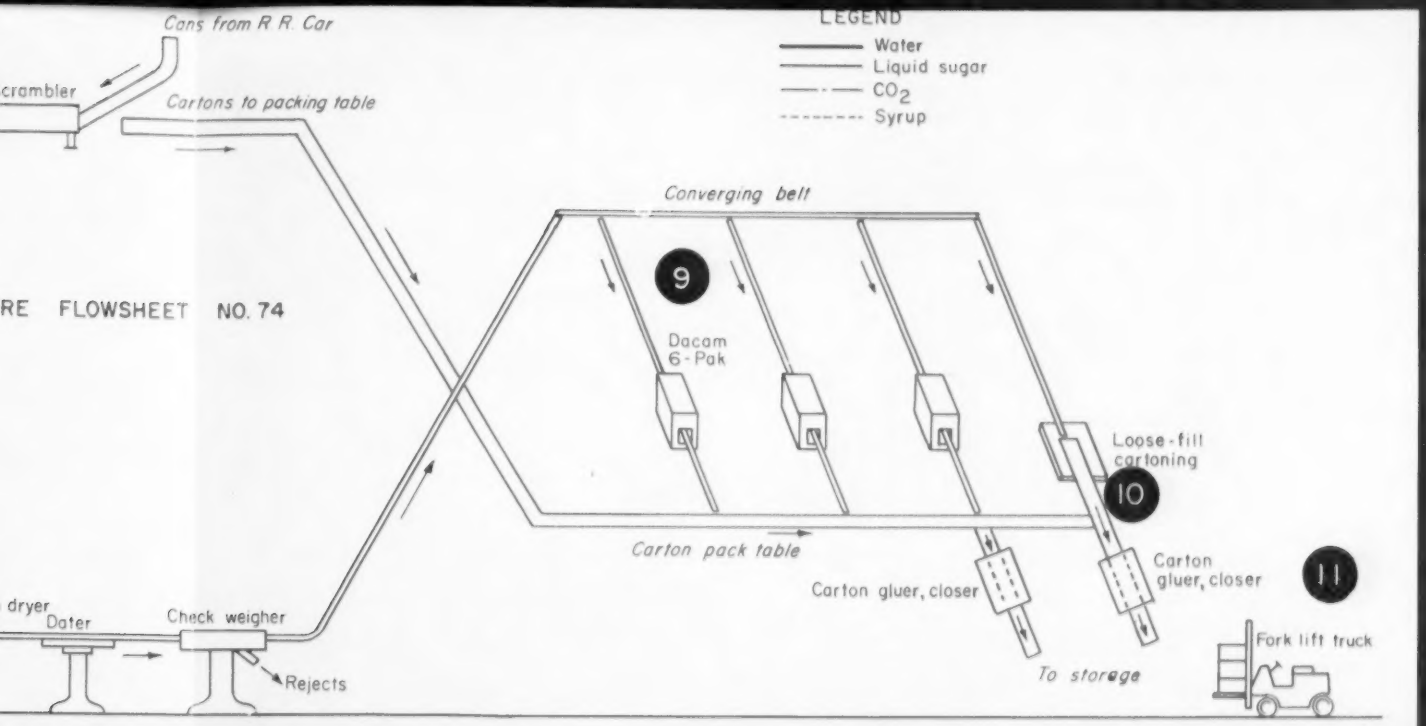
4 **EMPTY CANS** get hot water rinse, steam jet in enclosure (arrow).

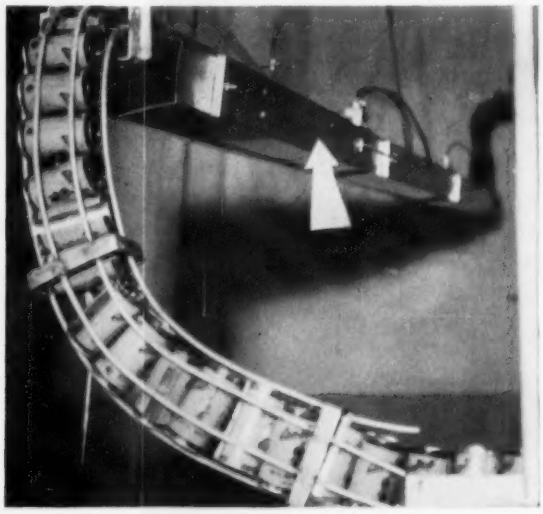


9 **PACKER** automatically assembles cans in groups of 6, forms, seals carry-home cartons around them.

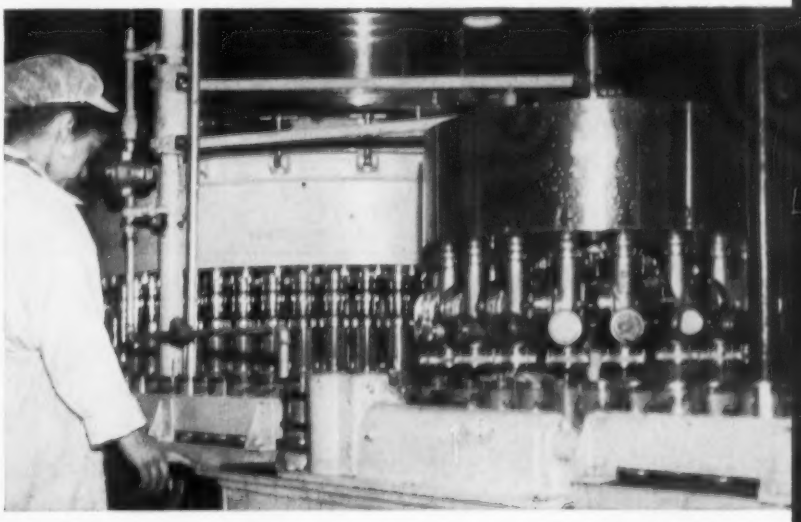


10 **FILLED CANS** are glued, sealed, palletized (left). A elevator (right), can track (top), empty carton co





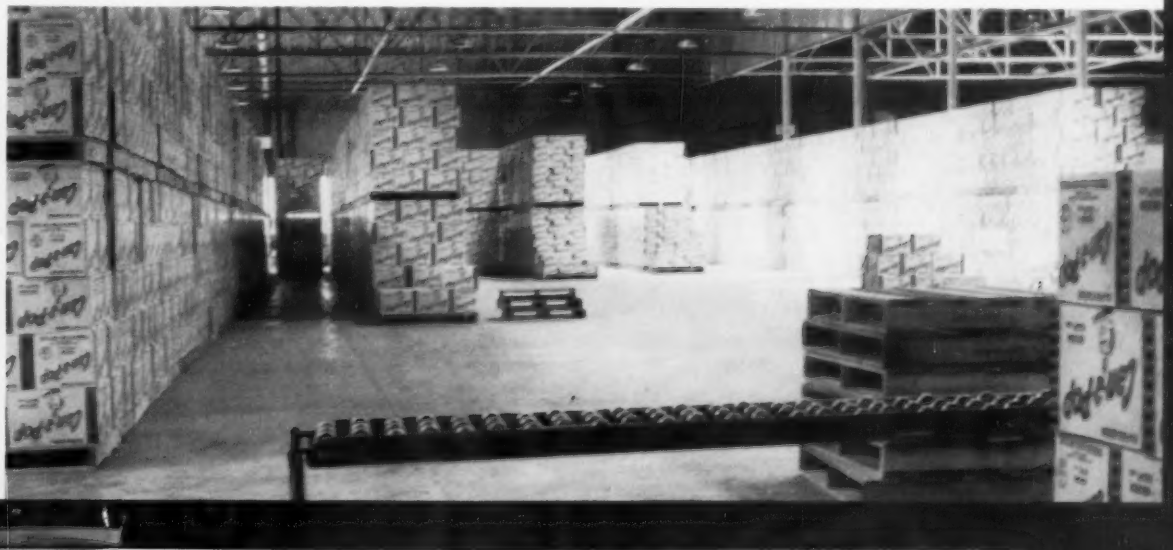
5 **TUNNEL** (arrow) has bank of u-v lamps to sterilize cans just before they enter syruper.

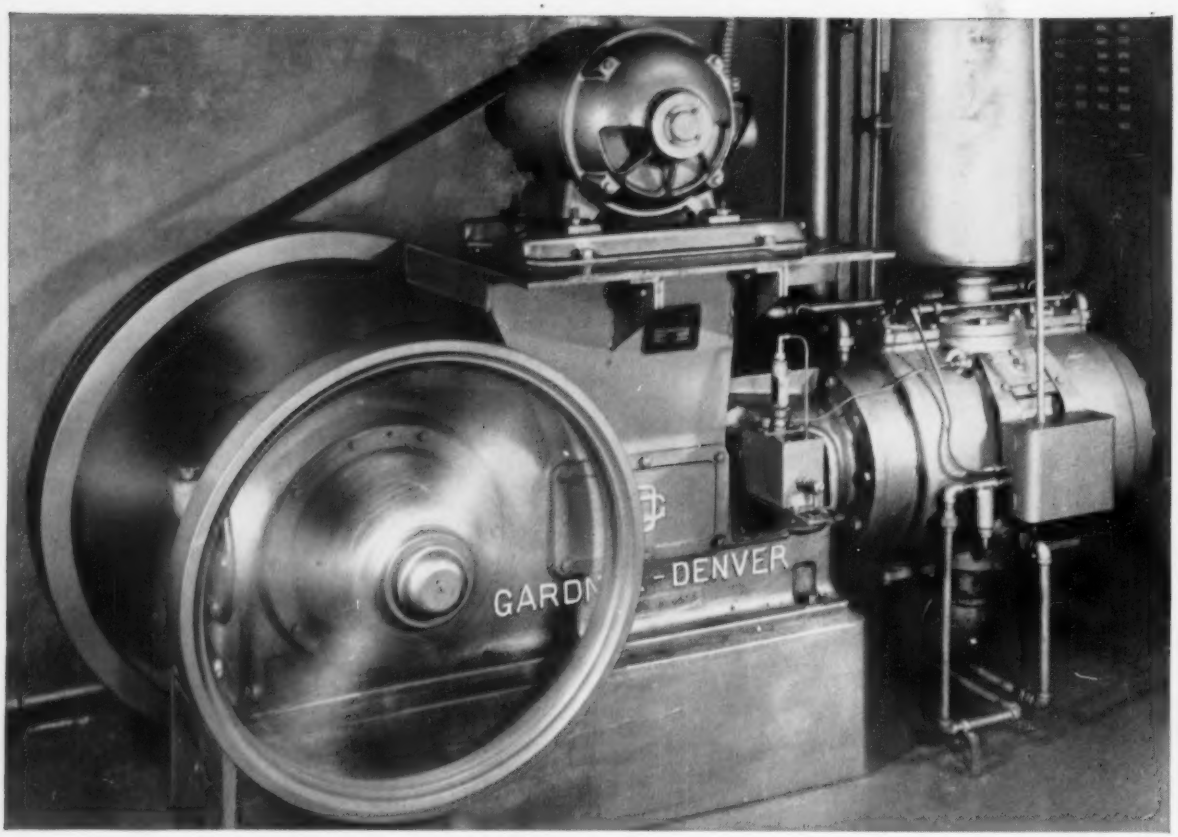


6 **COMBINATION** low-pressure syruper-filler delivers measured quantity of flavored syrup (right), completes filling with carbonated water (left).

ft). Also seen are can
on conveyor.

11 **WAREHOUSE** has 30,000-case storage capacity. Cases are palletized as they move from sealer (on conveyor, foreground), then fork-trucks stack loaded pallets in storage.





Model RX — 89 to 1292 c.f.m. Bulletin HAC-40.

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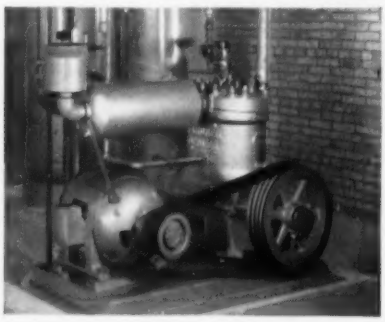

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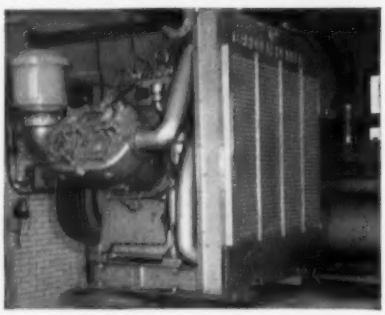
Model WB-142 to 686 c.f.m Bulletin WB-10.



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Gardner-Denver Company, Quincy, Illinois
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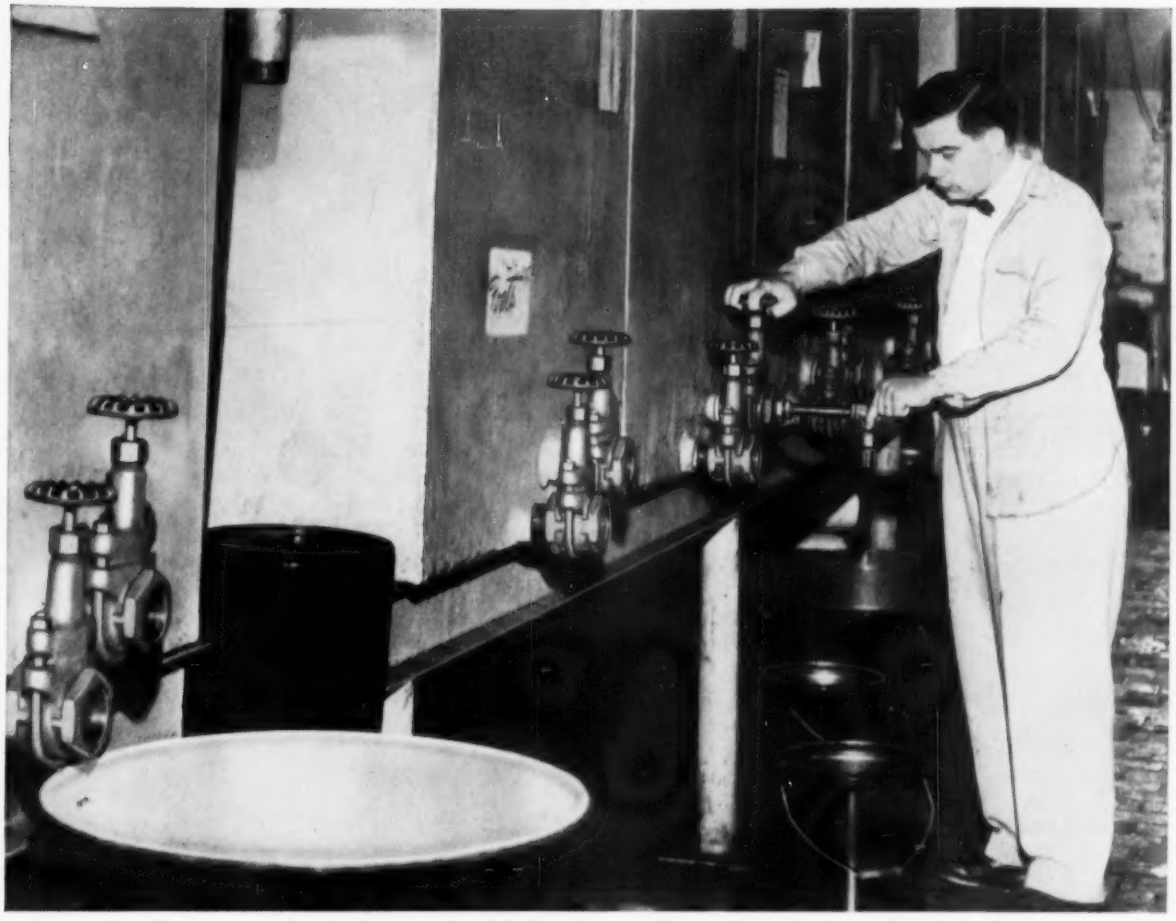

Leakage troubles here stopped by these CRANE VALVES

THE CASE HISTORY—Read why Hysan Products Co., Chicago, changed to Crane Clamp Gate Valves in all process and storage piping. Hysan makes liquid waxes, pine oil and coal tar disinfectants, liquid soaps, and similar chemical specialties.

Valves formerly used were similar to Crane Clamp Gates, but only in appearance. They lasted no more than 2 to 6 months—leaking at seats and disc with no more than 3 to 12 operating cycles daily. Maintenance and replacement costs mounted—as did down-time losses. The leaky valves on tank lines forced repeated transfer of storage stocks. As many as 3 men were needed to make valve repairs.

All this trouble stopped when the plant installed Crane No. 488 Clamp Gates. After almost 2 years' service, these valves show no sign of wear or leakage. An occasional pull-up on the packing is all they need—and one man handles all piping maintenance.

CRANE CLAMP GATE VALVES

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SPLIT-PENNY PROFITS are the order of the day in the meat-packing industry.

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"We started using Whites 15 years ago," Arthur Neuhoff says. "We see a better advantage than ever in these modern White 3000's in our fleet. We run them 125,000 miles a year . . . with our shuttle system they're on the go constantly . . . carrying bigger payloads, too!

"The White 3000 is the best advertising we can get—they are truly rolling billboards.

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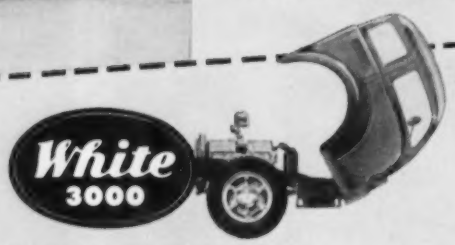
"We like Mustang Power, too. One of our Whites has gone 200,000 miles and we haven't removed the head of the engine. Wonderful, low-cost dependability."

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio



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FINANCIAL AID TO HIGHER EDUCATION

Our Colleges and Universities Are Living on Borrowed Time

. . . time borrowed from underpaid faculty members

The chart on this page tells a story of profound importance to every American. It is the story of the financial beating our college and university faculty members have been taking in the past 14 war and postwar years.

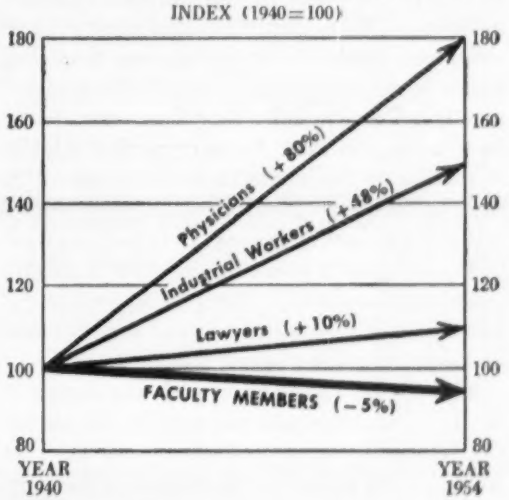
On the whole, this span of 14 years has been one of great and growing prosperity. But, as the chart shows, our college and university faculty members have, as a group, had less than no share in it.

During this period, from 1940 through 1954, the real income of the average industrial worker (that is, what his wages would purchase in goods and services) has increased by almost one-half. Among professional groups, physicians have enjoyed an increase of about 80 per cent in their real income. Lawyers, far less favored financially, have had an increase of about 10 per cent. But faculty members have not only had no increase at all; over these years of prosperity their average real income has fallen by 5 per cent. These figures do not take account of the increase in taxes since 1940.

Senior Teachers Hardest Hit

These figures are, of course, averages. For some groups of faculty members it has been better; for others worse. It has been particularly hard on senior faculty members. Between 1941 and 1953 their salaries lost about 8 per cent of their purchasing power. Being deeply committed to their careers they could not respond to alternative employment opportunities as readily as could their junior colleagues. For junior faculty members there was some increase in real income between 1941 and 1953 but only about half as much as the average for the nation.

What's Happened to College Faculty Salaries*



* Real Income before Taxes

Source: Council for Financial Aid to Education; U. S. Dep't of Commerce; U. S. Dep't of Labor.

Public Colleges Fare Better

There are also marked differences in the average financial reward received by faculty members in different types of colleges and universities. A recent study by the Council for Financial Aid to Education indicates that, in the last academic year, 1953-1954, teachers in privately endowed, independent colleges and universities were paid an average salary about $1000 less than that paid to faculty members in tax-supported institutions. The same study indicates that salaries far below the average are especially common for faculty members in the small private liberal arts colleges. This study found that during the last academic year the average salary of all college and university faculty members was about $4700.

The special difficulties under which the independent colleges and universities, and particularly the independent liberal arts colleges, are laboring to get back on their feet financially have been discussed in previous editorials in this series. These difficulties underline the need of special help for these institutions to which business firms are now contributing in increasing volume. However, the problem of providing better salaries is not peculiar to any particular type of institution.

Faculty Members Not Greedy

It is not easy to prescribe a precise standard of fair pay for college and university faculty members. This is partly because they put less weight relatively on money rewards than they put on rewards of scholarly accomplishment and prestige. Consequently, they have consistently been willing to work for very modest salaries in relation to the intellectual ability, education and application required. Obviously, however, it is the dictate both of fairness and good judgment to see that faculty members are given a roughly proportionate share in the general prosperity. Indeed, their crucial role in our society could be made to justify a larger share than this.

There is no way to know with any degree of precision what the underpayment of our college and university faculty members over the past 14 years has actually cost the nation in terms of reduced quality of intellectual performance of those institutions. One reason is that the damage has been minimized by the devoted services of many faculty members who have loyally stuck to their jobs in spite of the great financial discouragement.

It is obvious, however, that, if no grave deterioration in the intellectual performance of our colleges and universities has occurred so far, it is because we have been living on borrowed time. It is time borrowed from faculty members who have, in effect, been subsidizing these institutions by their financial sacrifice. This arrangement is not only a menace to the cultural and intellectual life of the nation, it is also a menace to our national security in a time when successful national survival may well depend in peculiar degree on the full development and utilization of our intellectual resources. We depend on our college and university faculties pre-eminently to provide this development. Adequate financial reward for such service is an elementary form of national insurance.

Many of our colleges and universities are working hard to improve the financial lot of their faculty members. Business firms are also playing an increasing role of providing the necessary financial assistance. The methods being used by business for this purpose will be the subject of another editorial in this series. However, **vastly more must be done, and quickly, to stop the financial beating being taken by our college and university faculty members if the nation's welfare and safety are to be properly protected.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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In Renaire's new 75,000-square-foot plant over 20,000 pounds of meat are frozen daily in direct contact with expansion plates through which "Freon" refrigerant flows.

Why "nothing but 'Freon'* would do" for the $100,000 refrigeration system in Renaire Freezer-Foods' new plant

"In the 'make-up' room kept at 0°F.," says Mr. Renaire, "these units must be ready to run around the clock . . . we need absolute dependability."

Chief Engineer Earl Neff is pleased with his equipment . . . states: "Before we used 'Freon,' maintenance was a problem—now it's down to nothing!"

"We use only 'Freon' for our 100 tons of refrigeration because it's the finest available refrigerant, and we know it gives us the finest frozen-food quality," is the firm opinion of Mr. Bill Renaire, "America's first television butcher." "In making Renaire America's largest food-plan organization," he says, "having our foods keep their quality through the freezing operation is of paramount importance. We have 50,000 very satisfied customers to prove that our system, which depends vitally on 'Freon', *does* keep food quality high."

In their installation, "Freon-22" monochlorodifluoromethane expands within direct-contact plates, freezing food on the plates so fast that it can't lose its "fresh" characteristics—color, texture or flavor.

Experience with "Freon-12" built confidence in Du Pont

Mr. Renaire told us, "Three years ago we were searching for a refrigerant that would give us low temperatures plus safety and efficiency. Several engineers told us that 'Freon-22' was too new. And it was true that 'Freon-22' was a stranger to us, but the names 'Freon' and 'Du Pont' were not. We'd had very good experience at higher temperatures with 'Freon-12' dichlorodifluoromethane. We were sure we couldn't go wrong . . . and we didn't. So far as I'm concerned, nothing but 'Freon' would do."

Many food-field leaders, like Mr. Renaire, have learned to rely on the pure, uniform quality of Du Pont "Freon" fluorinated hydrocarbon refrigerants. "Freon" refrigerants can't contaminate foods . . . are safe and efficient in all equipment, including direct expansion systems. They are nonflammable, nonexplosive, virtually nontoxic. Get full information by writing E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division 84, Wilmington 98, Delaware.

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"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

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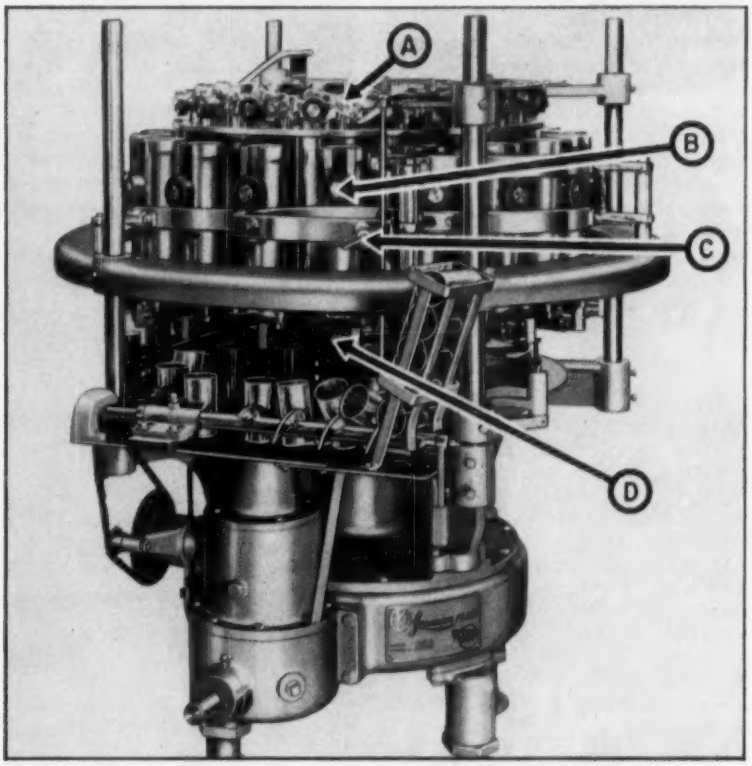
. . . THROUGH CHEMISTRY



PRECISION-BUILT filling machine is designed to operate efficiently at high speeds. Similar units handle tin or glass containers in top-, bottom-, or gravity-fill manner. Lettered points key to four closeup photos on right.

800-a-Min. Filler Has Many Features

Smooth, automatic operation and superior sanitation are features of the new line of Librascope precision-built, high-speed rotary fillers. Termed simple and economical to run and maintain, these machines offer filling speeds up to 800 cans—and even glass containers—per minute (on the 27-station units).

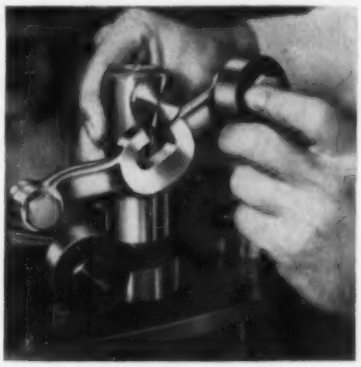
Highly accurate filling is obtained through eccentric cam controls that are adjustable while machine is in operation. Filler pistons are precision-machined to an accuracy of .001 in. to assure accurate product measurement. Special pistons are of 1-piece design, with full-bearing cylinder and without connecting rods.

Sanitation is stressed in design of this equipment. All product parts are of stainless steel or non-copper bearing metal. All exterior shafting, too, is of stainless. Filling valves and pistons as well as simple clean-out plugs at base of piston cylinders are quickly removable for easy cleaning—in about 30 min.—without use of special tools. And replaceable seats minimize repair costs.

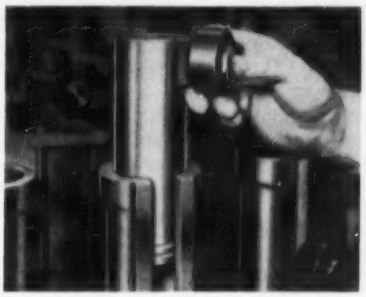
Product spillage is checked by specially designed filling valves that assure positive cut off of product—even cutting meats—from filling tank to cylinders. Special to each plunger type valve are the bottom plug, beveled metal-to-metal discharge seats, and paired slits to discharge excess product back into filling tank. Cylinders are also fixed above product level so that product flows upward past pistons to avoid spilling onto the floor. Valve diameters can be altered to meet product requirements.

Units are available for both top and bottom filling. They may be used for either tin or glass containers, and present production includes three models, each with varied modifications to meet different production needs.

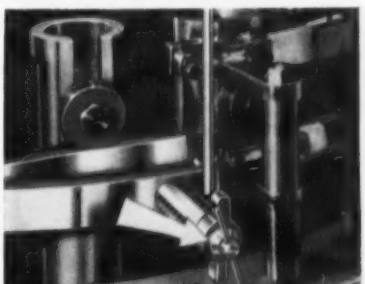
All models are of the rotary type with space- and weight-saving type



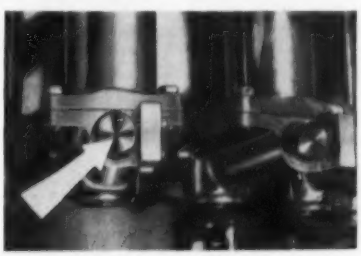
A CAM ACTION permits easy removal of valves without use of special tools.



B 1-PIECE PISTON is hand-lifted out of cylinder for easy cleaning.



C ECCENTRIC CAM (arrow) can be precisely adjusted for fill.



D CLEAN-OUT PLUG (arrow) at base of piston cylinder is easily removed for speedy cleaning.

screw in-feed. Screw feeds can handle containers fed either by conveyor or overhead chute. Each model is made with 12, 18, or 27 stations to handle various maximum size can or glass-container ranges and operate at maximum speeds.

Filler model "P" is a general purpose, *top fill* unit for handling products like oils, tomato pastes, applesauce, juice concentrates, and dog food. It is designed to carry containers from feed store through the filler in a plane slightly below the discharge part of the valve.

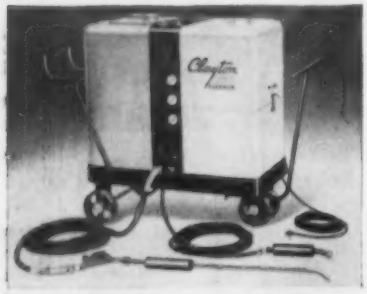
Model "PB"—a *bottom fill* unit—permits filling of such products as mayonnaise, peanut butter, meat spreads, and other products that tend to trap air bubbles in the container. Discharge valve and container lifter are both carefully engineered for their specific purposes to insure a clean, perfectly balanced operation.

Model "G" is a *gravity filler* for single-strength juices and other light, non-viscous liquids.

All models may be readily direct-drive synchronized with various types of cappers and closing machines. And no-can-no-fill attachment returns product when no container is present.

In addition, all types of agitators—to meet product requirements—may be added to the filler tank. Units, too, are equipped with adjustable legs for leveling and establishing height. And the cast iron, totally enclosed base has a bevel-gear drive to all parts.—*Librascope, Inc., Glendale, Calif. and W. F. and John Barnes Co., Rockford, Ill.*

Circle 131A on Reader Service Card



Combined Steam-Rinse Unit Eases Plant Cleanup

For maintenance operations in any part of the plant, this new device combines a portable steam cleaning machine and a high-velocity rinse unit or pressure washer in one assembly. It is termed ready to operate as soon as utility connections are made.

This unit (Model LHR) is designed to deliver 150 gal. per hr. of balanced cleaning solution, which is in the form of a penetrating heated spray that rapidly saturates, emulsifies, and removes grease, oil, and dispersed solid particles. Spray is directed at surfaces through a jet-type nozzle, which is said to cut in half the time normally consumed in cleaning cement floors, work surfaces, and equipment.

Other applications: Conveyor systems which, when regularly freed of grease and oil, operate more efficiently and are less of a fire hazard; and maintenance of fork lifts, engines, trucks, automobiles, and cranes.

In addition, this unit has an unusual feature. Without stopping operation, it may be converted to a high-pressure rinse unit delivering 275 gph. of hot or cold water at pressures up to 150 psi. This is done simply by resetting the controls.—*Clayton Mfg. Co., El Monte, Calif.*

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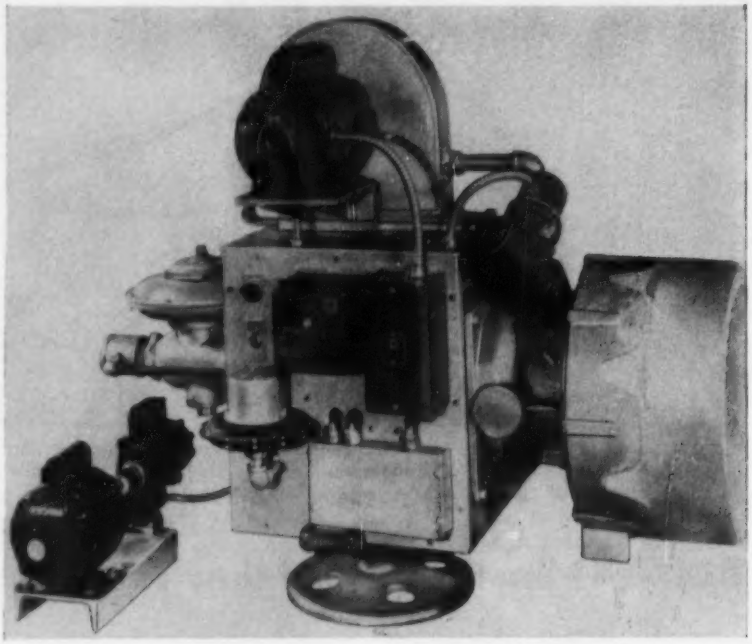

Combination Gas-Oil Burner Is Fully Automatic

Offered for automatic "off-on" firing of ovens, heaters and boilers is a new rotary-flame combination gas-oil burner that has firing rates up to 3,000,000 Btu.

On this "SP-890" unit, a snap-switch control located on the side panel automatically changes fuel. This switch sets in operation all necessary controls for the particular fuel used. And no mechanical or electrical changes are necessary.

Unusually clean firing is said to result from operation of an outside-mounted air switch, which is interconnected with fuel controls. This switch delays opening of the main fuel valve until air pressure is at "full on", in order to deliver the correct amount of air for complete combustion.

The device also provides a safety feature in that if the air supply fails, all fuel to the burner is instantly cut off.

Positive ignition is another feature of this unit. With oil fuel, direct electric spark ignition is used to start the main flame. And when gas is used, a gas pilot ignites it. This pilot must "prove" itself to the electronic safety circuit before main fuel is admitted. Flame-failure protection is provided by electronic eye and flame electrode-detectors, so arranged that no changes are required in electronic controls when switching from gas to oil, or oil to gas.

Unit has UL approval, and is completely packaged to contain: Blower, burner, oil pump with motor, built-in tuyere, air/gas mixer, safety equipment, transformers, valves, regulators, filter, piping, and wiring.—*Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill.*

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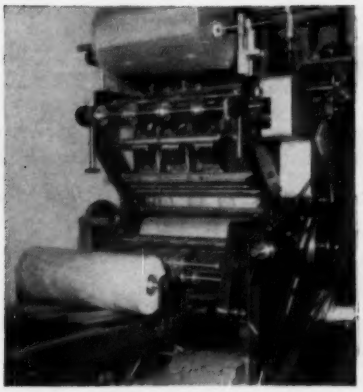
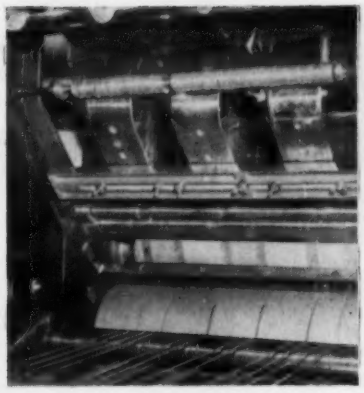
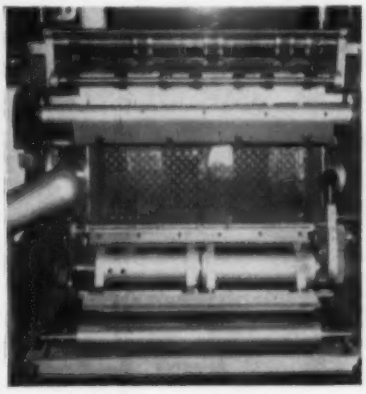


New bag former



Closeup of control collars



Aligning belt in rear

Multi-Size Bags of Greater Strength Formed on High-Speed Machines

Versatility in sizes and materials handled, high-speed production, greater bag strength, and improved centering for subsequent printing are advantages cited for this unit.

Called the Renka, it departs from conventional methods — forms bags against the grain — to produce flat bags with reinforced edges and gusset bags that have neither center nor bottom seam.

This is achieved through use of a vertical construction where the web travels downward through the bag forming stations. For flat bags, top and bottom edges are glued and folded first before cut off occurs. The folded side seam is formed last, just before discharge. Positive transfer of the cut web section to the folding cylinder is effected by a moving vacuum belt arrangement. No guide rollers are employed, thus slippage cannot occur. And folding cylinders are equipped with self-adjusting grippers that automatically compensate for varying thicknesses.

Gusset bags are made in the lengthwise direction—with the grain. The gusseted sides of the bag are first folded accordion-fashion and then glued after the bottom is formed.

Bag-size flexibility is obtained with use of quickly adjustable metal collars (shown in center photo) that are secured to the shaft with Allen screws. This permits formation of up to eight bags per revolution of the master reel. Sizes range from a minimum of 2 in. long x 3¼ in. wide to a maximum of 21 in. long x 13 in. wide. And variety of packaging materials handled includes cellophanes, pliofilm, Mylar, cellulose acetate, paper, kraft, and foil.

With the master reel rotating at 10,000 rph., production of up to 60,000 bags per hr.—depending on dimensions—is possible. High-capacity unit offers savings in space, labor, and maintenance by replacing several conventional machines required for comparable output. Yet this unit occupies only an 8 x 3 ft. floor space and has a height of 62 in. Greater bag strength is achieved by forming against the grain (witdthwise). Bags may be made with flush even tops or with a lip. And for extra reinforcement at the bag's weakest point, a plasticized string can be placed under the lip. This tear-resistant feature cuts costs by greatly reducing waste caused by damage in rapid automatic packaging or in transit.

Cutting shears, controlled by elliptical gears, produce a straight web cut at high speeds. And to accurately align the web for printing, this unit uses an automatic vacuum guide belt (right photo) that also permits handling of smaller bags. Suction pump is conveniently housed at the side.

Unit also features minimum changeover time from size to size. For this only one gear, which controls width of the bag, is involved. Machine is manufactured in Holland and made to American standard specifications. Machine and spare parts are available in the United States from—*Geveke & Co., Inc., 25 Broadway, N.Y.C.*

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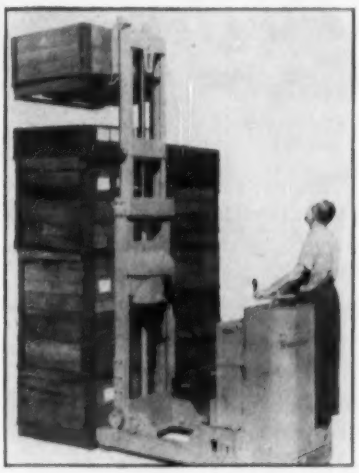

Retracting Fork and Mast Highlight New Stacker

Greater reach—130 in.—and increased load capacity (4,000 lb. with a 36 in. pallet) are offered by this new rider-operated electric stacker. Designated ESRT Transveyor, its fork and mast assembly—not just forks alone — extend and retract 36 in. within the frame. And unit is designed for tiering and detiering in aisles that narrow to as little as 6½ ft.

Main frame members are of formed solid steel, and heavy cast steel side members insure support for uprights. Latter are cold-drawn alloy steel channel sections, securely anchored to side members of frame which extend vertically to provide support. Cantilever (carriage) and upright rollers are high-carbon, cold-finished steel with crowned surfaces for self-alignment and longer life. Forks are high-carbon solid steel bars designed for strength at the heel.

Drive mechanism is fully enclosed with first-reduction chain and second-reduction spur gears operating in oil. Brakes are double-shoe, external-contacting type with heavy-duty brake lining, spring applied. For operator

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safety, a dead-man control automatically applies the brake when the operator has to leave the vehicle unattended.

Two motors are used, one for hydraulic lift and one for traction. Both motors are series-wound d.c. type with normal rating of 12v., high starting torque, and overload capacity. And frame design provides ready accessibility to battery by permitting removal from side or top.—*Automatic Transportation Co., 149 W. 87 St., Chicago.*

Circle 133B on Reader Service Card

Bottle-Stopper Clamp Has Many Lab Uses

This clamp is designed to hold rubber stoppers firmly in place in large 5-gal. storage bottles, or other sizes that take a 2½-in. stopper.

Unit has a wide range of applications in chemical, bacteriological, and biochemical laboratories. These include: Transfer of solutions by air pressure to other containers, culture growth under an atmosphere other than air, use with solution storage receptacles, or employment as a "C" clamp to hold flat objects in place for cementing.

Cast of aluminum for strength and light weight, this clamp has a U-shaped yoke that measures 3 in. from tip to tip. A hinged arm, which extends from a pillar at the base over the center of the stopper, is forced downward by an adjustment screw. This holds the stopper firmly in place. And the wide yoke surface provides a secure clamp beneath the bottle neck rim.

With clamp applied, the stopper is forced uniformly against the neck to prevent "popping." And holes or slots for glass tubing may be drilled or filed through the clamp finger.—*Central Scientific Co., 1700 Irving Park Blvd., Chicago.*

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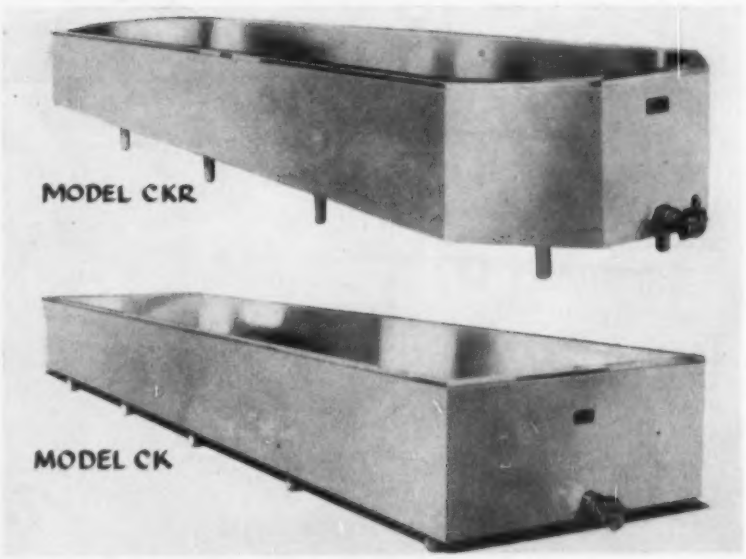

Heavy-Duty Cheese Vats Up Process Efficiency

Design, performance, and appearance are outstanding features cited for a new line of heavy-duty cheese vats, known as Cheddar-King.

Units are of all-welded construction and fully insulated with resistant Fiberglas. A special steam system, removable without dismantling vat, distributes heat uniformly and gently around bottom and sides. Inverted "U" channel pan supports are spaced for maximum heat transfer, yet provide proper bracing for the stainless steel inner pan.

Sides are rigidly braced but all external surfaces are smooth and streamlined. Sides of inner pan are vertical to fit curd knives, while the bottom is pitched for proper drainage.

Series is available as a standard square end or round end (designed for use with automatic mechanical forking and agitation). Capacities range from 6,000 to 20,000 lb. in 24 standard sizes, while special sizes are also offered.—*Kusel Dairy Equipment Co., Watertown, Wis.*

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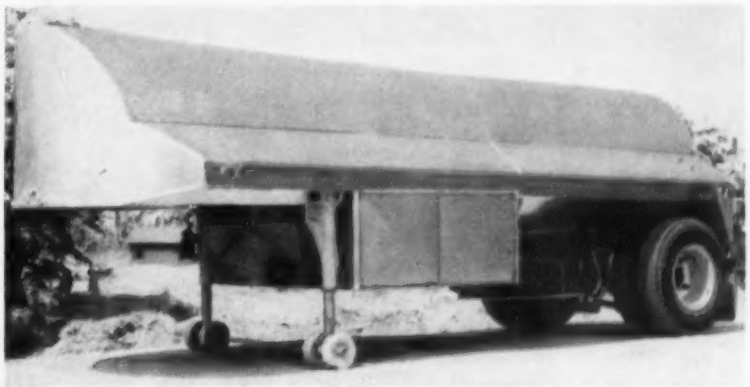
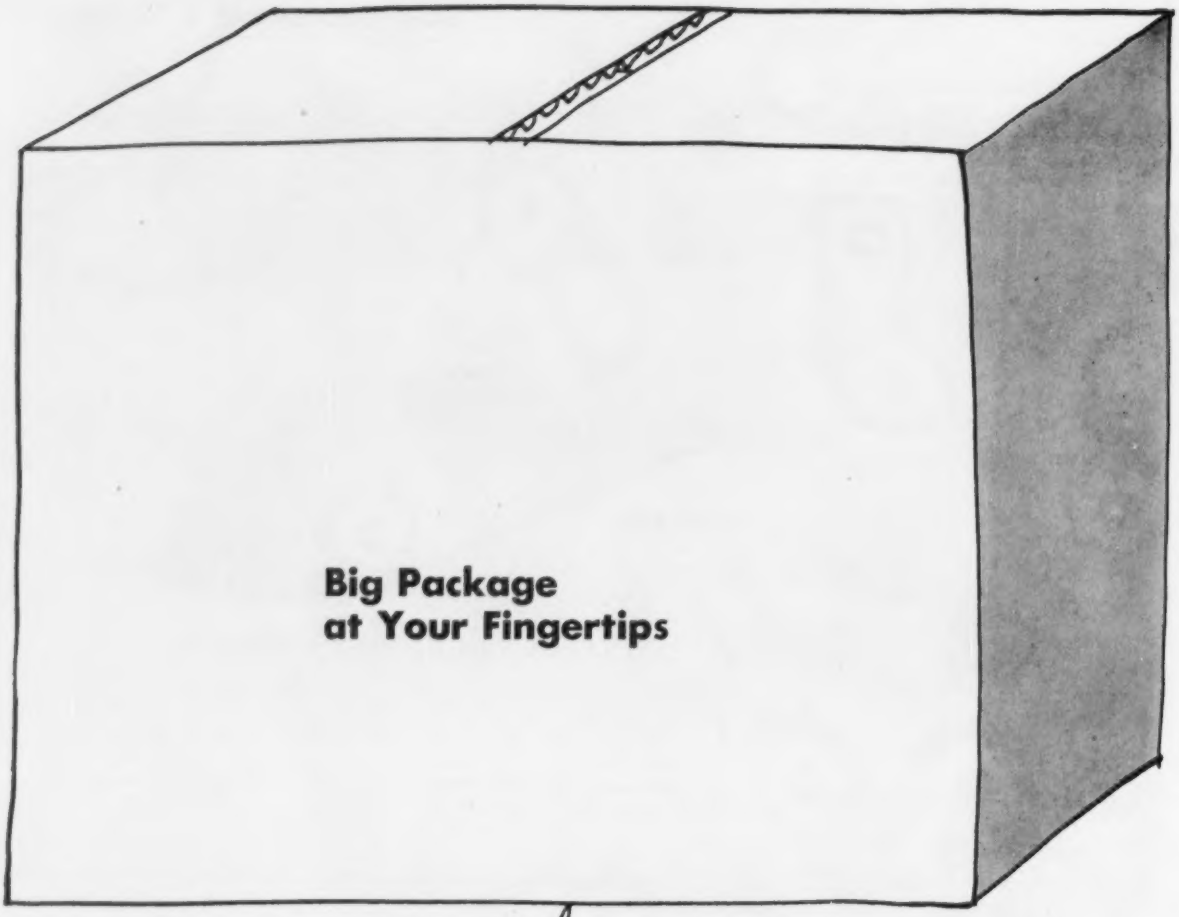


"Drop Belly" Dairy Tanker Ups Payload

This new unit reportedly hauls a payload of 2,850 gal.—16% more than conventional dairy tankers. Its round, arch-type construction features a "drop belly" built into the chassis, which gives added strength and effective baffling for partial loads. And low center of gravity, with load suspension between the wheels, eliminates side sway. Its manhole is on the side and inside the pumping box, instead of on top.—*Stainless, Inc., Van Nuys, Calif.*

Circle 135C on Reader Service Card

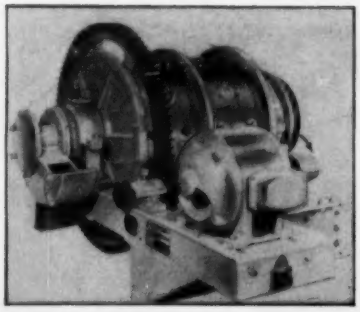


Big Package at Your Fingertips

GO TO THE BIG National Packaging Exposition at Chicago's International Amphitheatre, April 18-22! What a lot there is to learn! *We're* going. Operating out of our own exhibition booth for the 24th time (out of a possible 24), FE's editors will be conferring with food-plant operators . . . gathering facts from nearly 400 exhibits . . . wrapping the show up in an early picture-story report. If you go, drop in at Booth #713. We'd like to talk to *you* about the ever-changing food-packaging scene.

If you *can't* make it this time—well, that's *our* main reason for being there. To be your eyes and ears . . . which is how we got our reputation as the magazine that, more than any other, is *read* by the men who *run* the plants that *lead* the food industry

FOOD ENGINEERING



Milling Problems Solved By Pilot Grinder

Pilot plant grinding operations are said to be simplified with use of a new steel-head ball mill, offered as a packaged unit with motor and drive.

This flexible unit is mounted on a steel base and its shell sections can be added or removed as required to more accurately duplicate mill problems. And the same base is used whether the mill consists of one or two shell sections.

Mill illustrated has a large diameter discharge which may easily be reduced as required. Feed is by scoop but the feed plate may be removed for direct charging by launder, chute, or pipe.—*Denver Equipment Co., P. O. Box 5268, Denver 17.*

Circle 137A on Reader Service Card

Sanitary Tank Brush For Dairy Plants

Designed to meet sanitation requirements of dairy and ice cream plants is a new tank brush, all parts of which are termed resistant to fats, acids, and alkalies.

Called No. 330 NR, its Nylon bristles are deeply crimped to hold more water. And for long service, a special molded rubber block is used. Long bristles around the block and three tapered handle holes provide for quick and easy cleaning of all tank surfaces. —*Flour City Brush Co., 1501 4th Ave. S., Minneapolis, 4.*

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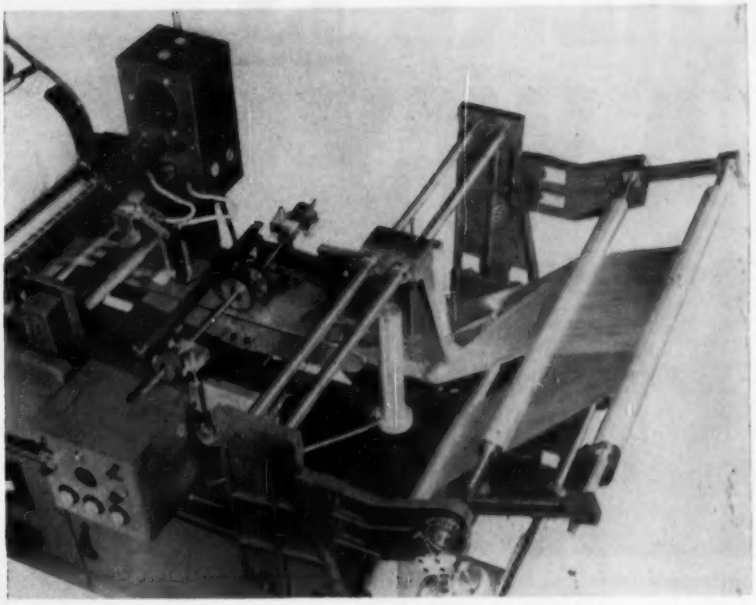

Unit Rapidly Forms, Seals Polyethylene Bags

A unique method for tube forming and center-seam sealing of polyethylene bags reportedly ups production and reduces waste on this new Model PO-2R machine. Air streams support the film, and seals are made with a fixed element that requires no protective coating. Also included in the mill roll stands is a quick splicing mechanism. — *Roto-Bag Machine Corp., 130 E. 13th St., N. Y. C.*

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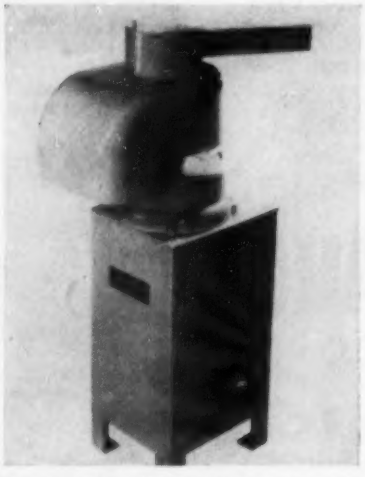

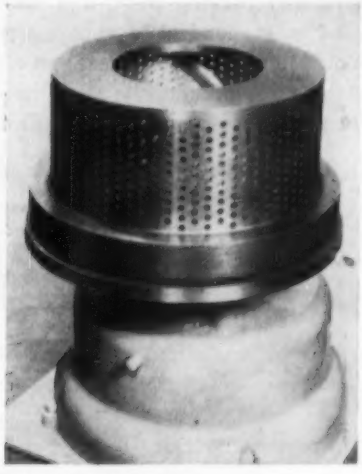

Centrifugal Unit Cuts Beef, Removes Gristle

Based on the action of centrifugal force, this new machine cuts (rather than grinds) meat into hamburger and removes tough gristle at rates of 2,000-3,000 lb. per hr.

Called Magicut, the unit offers many advantages over conventional grinders: Decreased trimming time (no need to remove gristle in preparing round and chuck), greater yield due to less waste in trimming, better color and flavor, more uniform appearance, and no bleeding of ground meat.

Meat is fed into the top of a vertical cylinder that revolves at 1,800 rpm. Sides of this cylinder are perforated, and at the bottom is a turntable that revolves at 1,200 rpm. At-

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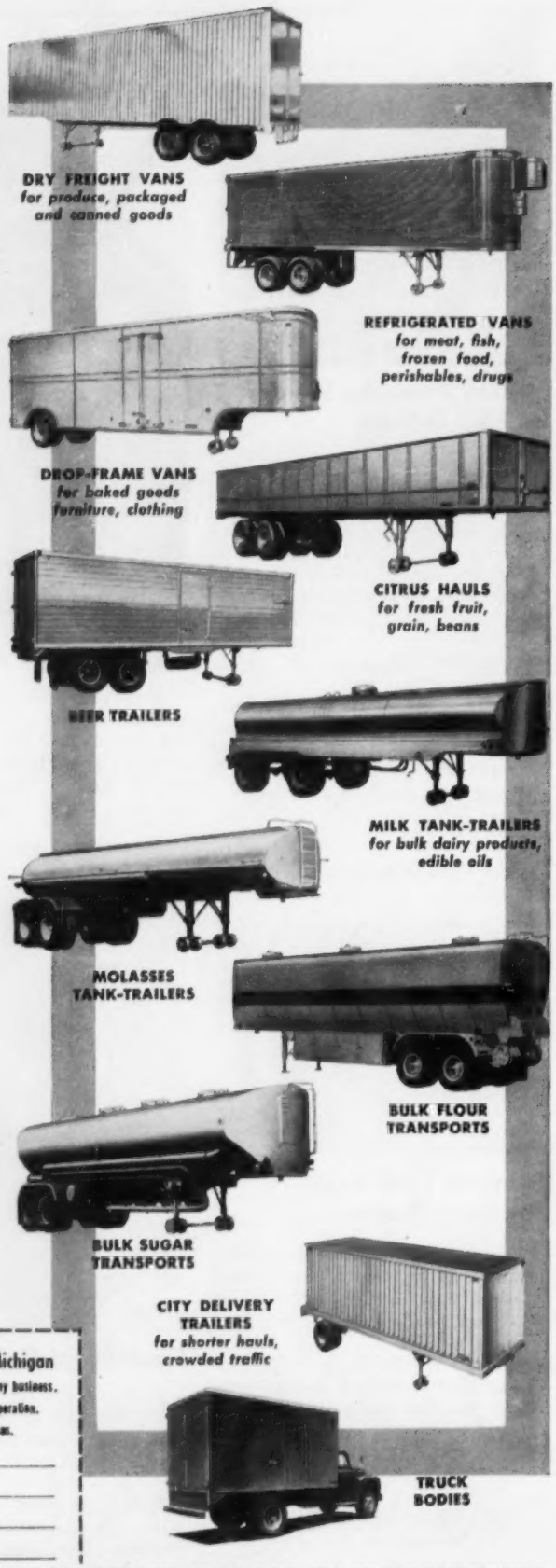

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tached to the turntable are two knives (photo, right) that extend upward along the inside walls of the cylinder.

As cylinder and turntable revolve, meat is pressed by centrifugal force against the perforations and knives shear off particles without bruising. In contrast, conventional grinders are said to have a tearing and lacerating action. Tough gristle does not enter the perforations but falls back into the center of the cylinder, where it forms a ball that can be discarded.

Furthermore, tests indicate that meat thus processed may be kept for four days, whereas conventionally ground meat is not considered saleable after 48 hr. This important difference is attributed to gentleness of centrifugal force as a processing means —less breakdown of cellular structure and less exposure of fluids to air.

Unit is in use at the commissary of Childs Co., Long Island City, N. Y. —*Gifford-Wood Co., Hudson, N. Y.*

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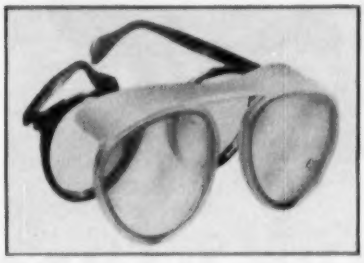

Eyeglasses Protected By Safety Clip-On

This new-type safety device for prescription frames offers shatterproof lenses in an unbreakable frame of tough, resilient polyethylene.

Called Tuc-Overs, it quickly snaps on or off and is held firmly in place by plastic clips which do not scratch frame or lenses. Lightweight unit prevents breakage or pitting of prescription lenses and can be used, with shatterproof green lenses, to cut out glare from sun or other light sources. Overeyes protection is provided by a visor which extends back to the forehead to repel dust and persipration.

Unit is made in two sizes to fit all prescription frames and has optically-perfect, shatterproof methacrylate lenses, 0.080-in. thick, which prevent eyestrain due to distortion. They fit snugly in the resilient plastic frame and may be changed without tools. *Watchemoket Optical Co., 232 W. Exchange St., Providence 3, R. I.*

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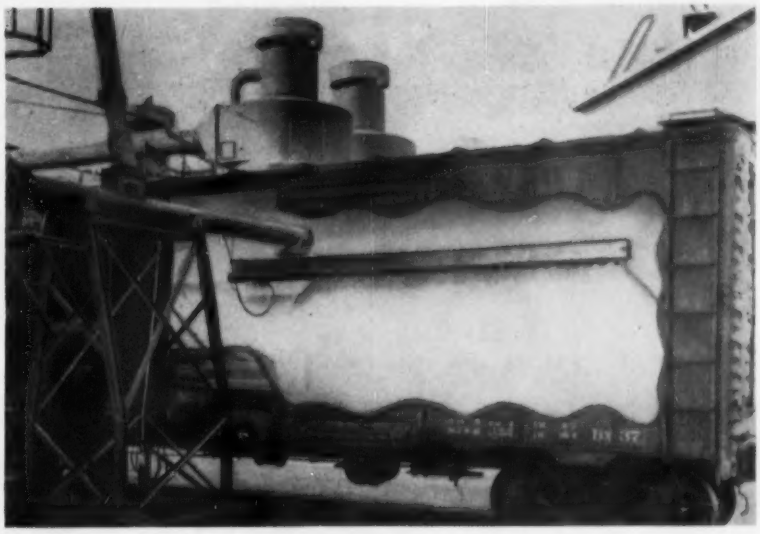

Bulk-Car Loader Prevents Product Segregation

This new portable rail-car loader is designed to eliminate dust and differential settling in loading mixtures of materials. It handles such segregating items as cotton seed meal, soy bean meal, grain, and orangle pulp at an average rate of 20 tons per hr.

Unit consists of an articulated screw-conveyor system cantilevered from a portable supporting frame outside the box car. Screw conveyor carries product through box-car door and distributes it along length of the car in the open bottom section. A special low-friction bearing enables conveyor to be jack-knived for removal from rail car through the door. And the frame is easily moved by one operator.

Conventional loading equipment—belt-type slingers, blowers, or gravity conveyors — create dust because of turbulence produced in projecting material horizontally through the air from car door to the ends. Also differential settling in the mixture occurs, which results in classification into a dense fraction at car ends and a bulky fraction in the center. Thus, samples from each location differ in analysis.—*Valley Foundry & Machine Works, Fresno, Calif.*

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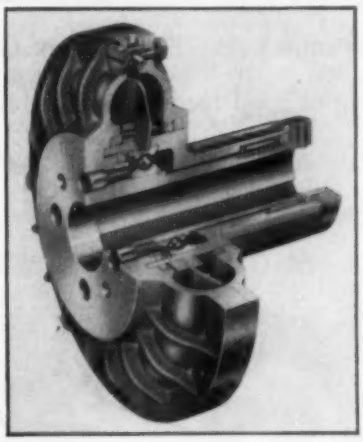

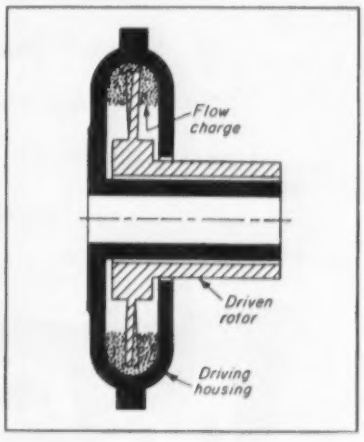

Unique "Dry-Fluid" Drive Has Wide Torque Range

Based on an entirely new principal, this "dry" fluid drive is said to easily handle difficult starting and reversing problems, and give a new kind of protection against shock and overloads in industrial power transmission.

Called Flexidyne, it's reported advantage over fluid-type drives is that

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it does not slip at normal operating speeds. And at the same time, in case of an overload, it is slippage which gives protection.

Unit consists of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which act like a fluid. It is this flow charge that transmits power from the housing to the rotor. It is easy to seal in, has a high density, and can stand relatively high temperatures.

In operation (see drawing), motor is connected to the housing and starts it turning at no load. This causes the flow charge to be thrown to the circumference of the housing, where the charge is compressed by centrifugal force and revolves with the housing. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving charge.

Rotor and housing reach identical speeds—unit operates with zero slippage between motor and load at normal running speeds. But in case of an overload, and before damage is caused, rotor slips relative to the housing by overcoming the friction and wedging action of the flow charge. In addition, a thermal switch that automatically cuts the electrical circuit if an overload persists, is available as optional equipment.

Amount of flow charge used determines torque capacity. Because it is easy to vary the amount of this charge, this unit gives exact starting torque needed for anything from the smoothest to the fastest start.

Accurate overload protection is assured since unit can be set to slip at anywhere from as low as 20% over full load torque to as high as peak motor torque. During starting and overload periods current draw is at a minimum, because with standard drive setting, motor is never pulled down to less than 90% of synchronous speed.

Originated in Europe, the new drive is redesigned to meet American standards. It will be available from stock of regular distributors.

Units will be available in two lines: (1) Flexidyne drives for convenient mounting directly on motor shafts and adapted for maker's taper-lock sheaves, and (2) couplings with taper-lock bushings for straight-line drives. First to be offered are four sizes of drives, rated at 3 to 30 hp. at 1,800 rpm., with other sizes to follow.—*Dodge Mfg. Corp., Mishawaka, Ind.*

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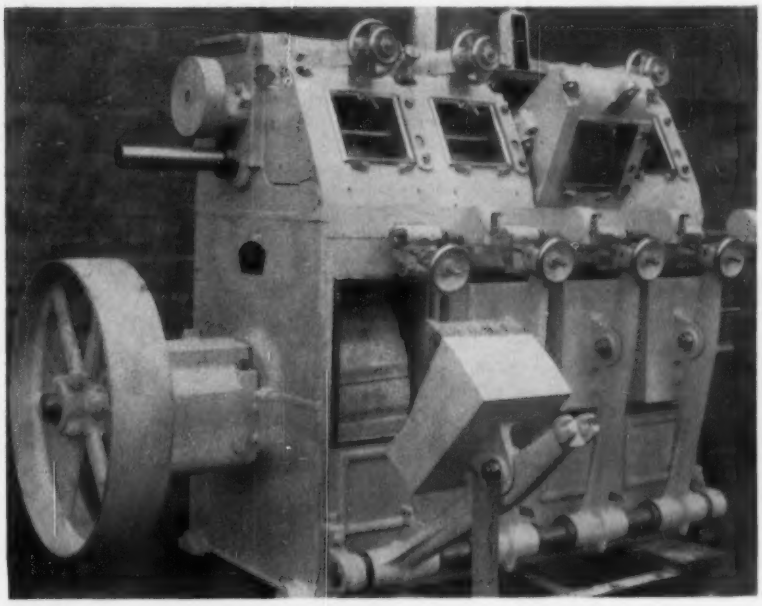


New Grain Mill Grinds at Low Pressure

Higher dough consistency, water absorption rate, and fermentation stability are advantages cited for flour produced in this new grain mill.

Known as Soder-Mill, its basic operating principle is grinding with development of minimum frictional heat. Flour thus obtained is said to receive gentler treatment than in conventional steel roller mills. This protects gluten proteins, starches, and natural color, while low grinding temperature prevents loss of volatiles.

Higher water absorption rate is attributed to the spheroid shape of the flour particles, in contrast to other milling operations which tend to flatten them. This mill has an hourly capacity of 200 to 400 lb. of wheat, or 200 to 320 lb. of rye, and it can handle these items in succession without special adjustments. Unit has also been used for grinding dried peas and beans, gums, and resins.

Operation is in two stages: Wheat grits are first loosened by two cast iron rollers of about 7 in. dia. These rotate at 280-330 rpm., and the gap between them is adjustable.

Then, in the second stage, loosened grits fall on a stone roller that is made of composition champagne stone for long service. This roller is about 10 in. long, 24 in. dia., and it rotates against a bowl (made of the same material) at 120-130 rpm. The stone bowl is suspended from a lever that is operated by an adjustable counterweight.

Therefore, pressure exerted by the bowl is constant while the grind-gap is self-regulating. In this way, the bowl also takes part in grinding. It performs a horizontal oscillating motion (simultaneous with that of the stone roller) that prevents channeling and assures continuous feed.

Grind-path for the grit is about 10 in., which it traverses in $\frac{1}{75}$ sec. And pressure developed in the grind area is a mere 0.43 psi. In contrast, a conventional steel roller mill of comparable diameter has a grind-path only a fraction of an inch long, uses contact times of 1/250 to 1/400 sec., and develops pressures as high as 145 to 220 psi.

Should flow of grain be interrupted, a safety device automatically prevents damage to stone parts of the mill. In that case, the balance arm on the weight regulator presses against a lever that retracts the bowl and halts grinding.

Power consumption is 1 to 1.3 hp. per mill chamber, which is about $\frac{1}{4}$ of that required by a steel roller mill of the same output.—*Gericke & Co., Zurich 5, Switzerland.*

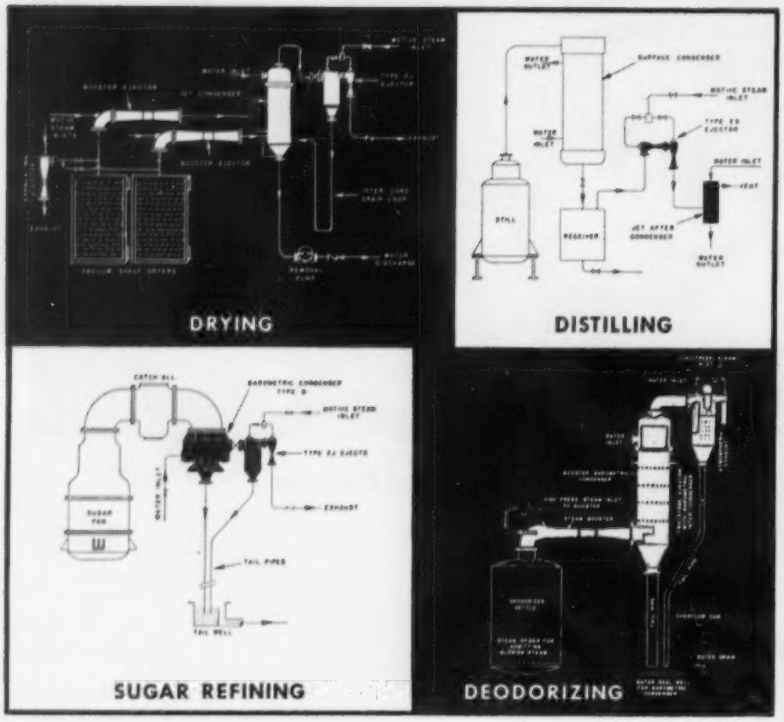
Circle 141A on Reader Service Card

Automatic Code Dater Prevents Smearing

By imprinting cartons before filling and while they are at rest, this cam-operated dater is said to eliminate smearing of the code.

New unit, for use on all automatic

FOR EFFICIENT VACUUM PROCESSING
C. H. WHEELER
STEAM JET EJECTORS



C. H. Wheeler has always led in the development of the steam jet ejector and its application to the vacuum process field. Today, our cumulative engineering experience gives you the benefits of low initial cost and reliable operation. You get flexibility in design and installation and efficiency, over a wide field of application. C. H. Wheeler Tubejets provide large volume removal of gases or vapors at very high vacuum, with low operating and maintenance costs. There are no moving parts. Operation is simply the opening and closing of valves. Long life is assured. Write for Catalog No. 1462. Representatives in principal cities.

TYPICAL USES IN FOOD PROCESSING

- VACUUM REFRIGERATION
- DRYING
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- SUGAR REFINING
- COOLING
- DEHYDRATION
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- FILTERING
- EVAPORATING

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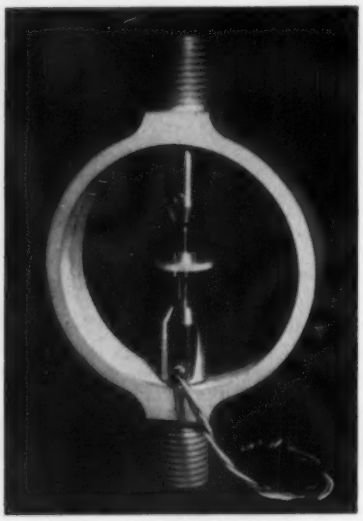
Steam Condensers • Centrifugal, Axial and Mixed Flow Pumps • Micro-Particle Reduction Mills • Deck Machinery

Equipment & Supplies

Triangle-Bagby cottage cheese and ice cream fillers, codes bottoms of cups with waterproof, wax penetrating ink. It is mounted within the conveyor frame of the filler, and located between the cup dispenser and filling station. Also dating before filling reportedly prevents the dater from becoming "gummed up."

Code consists of up to five, ¼-in. high, individual numbers or letters. Characters are easily and quickly changed, and a simple height adjustment adapts unit to cups with varying base heights. Dater is easily installed and can be used with any type of container.—*Triangle Package Machinery Co., 6633-55 W. Diversey Ave., Chicago 35.*

Circle 141B on Reader Service Card



Versatile Load Indicator

Accurate transmission of static or dynamic values of weight, force, compressive or tensile stress is reported with use of a new line of load transducers, called Daytronic Series 140.

Available in ranges from 500-50,000 lb., operation is based on the differential transformer principle for measuring minute displacements of an iron core in an inductive field. Units feature 1% linearity, a frequency range from zero to 1,000 cps., and stability of calibration and zero point. Temperature error and hysteresis are negligible.

Transmitted values can be measured with an accuracy of better than 1% and indicated, recorded, or used for control functions with associated equipment available from the manufacturer.—*Daytronic Corp., 216 S. Main St., Dayton 2, Ohio.*

Circle 142A on Reader Service Card

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Protect your product by using one of the dozen leading combinations of laminated transparent and extruded roll stock materials we have designed and engineered to fill your precise, particular packaging needs. We specialize in a quality product, so that you can capitalize on quality products.

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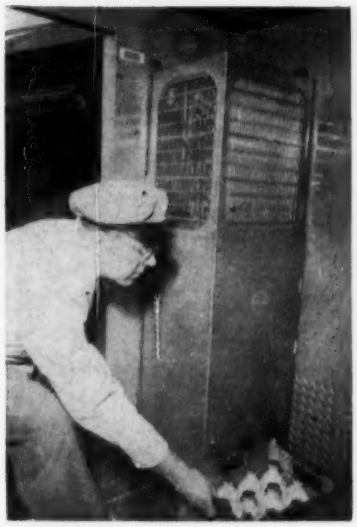

Continuous Refrigeration Protects Perishables

Of interest to the dairy and other perishable food branches is a new, fully insulated truck body. It features a refrigeration system (York) that is specially designed for continuous cooling and accurate temperature control in over-the-road operation.

The system is housed in a single small package that consists of a hermetically sealed refrigeration unit with two large cooling and two circulating fans. However, it requires less space than five milk cases and weighs less than 200 lb. Its generator is engine mounted and the voltage regulator is stowed under the dashboard.

Working off an electronic regulator which provides controlled electric power at any engine speed, the refrigerating unit maintains even temperature levels during all-day deliveries. And blower-driven cold air produces cooling throughout the payload.

In contrast to other cooling methods, which rely on outside power sources to 'store' cold in huge plates during over-night standby, this sealed circuit system permits the truck to generate its own continuous refrigeration during normal delivery throughout the day. Then at night, the unit is simply plugged into a convenient electrical outlet, thereby eliminating the need to transfer any undelivered merchandise to coolers.

And another money-saving feature of this system is the use of a.c. instead of d.c. power.

Installation and maintenance problems are minimized because the unit is flame-sealed and assembled by the

production line...

or shipping room

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Standard cuts conveying costs in *either* or *both* places

To speed operations, reduce breakage, increase safety, save manpower, time and money — mechanize handling with Standard conveyors. *It's an investment in efficiency that will pay you for years.*

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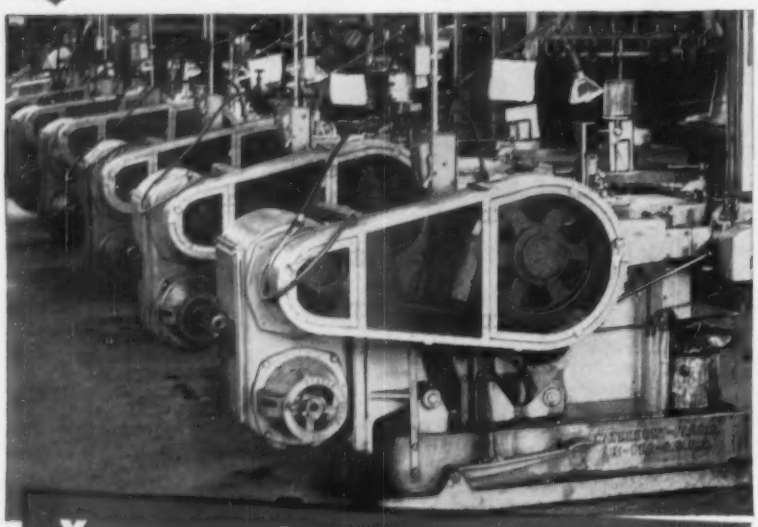
For more information, use coupon on last page.

REEVES Vari-Speed Motodrives provide the exact speeds required for maximum production and efficiency on this bank of six Waterbury-Farrel cold heading machine installation in the P. R. Mallory plant in Indianapolis.



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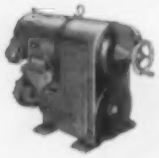
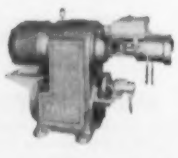


MOTODRIVE combines motor, speed varying mechanism and reduction gears in single, compact unit. Speed variations 2:1 to 6:1. Sizes to 40 hp. Also available in fractional sizes with 10:1 ratio.

VARI-SPEED MOTOR PULLEY converts any constant speed motor to an accurate, variable speed drive with 4:1 ratio. Rugged, dependable—Sizes to 15 hp. VARI-SPEED JR. available for light machinery.

VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Especially adaptable for heavy duty application. Fractional to 87 hp.



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Equipment & Supplies

manufacturers. Refrigeration is confined to short lines without gaskets or joints, thus refrigerant leakage is said to be negligible. — *Boyertown Auto Body Works, Boyertown, Pa.*

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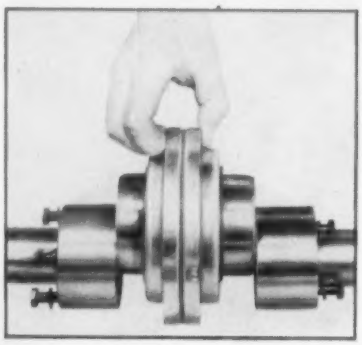


Spacer-Type Couplings Simplify Maintenance

A new coupling is termed ideal for use between motors and pumps — where a gap between shafts must be provided to permit removal of pump impeller shaft assemblies—or on any application where a large gap (up to 12 in.) cannot be avoided.

This unit (Type F Steelflex) is designed to permit installation or removal without disturbing either the driving or driven unit. It consists of four-main parts: Heat-treated cap screws, two shaft hubs, and the spacer.

Coupling is mounted by pressing shaft hubs onto their respective shafts with lockwashers and cap screws in place. Shafts are then positioned for correct distance between hubs and for minimum angular and parallel misalignment. Distance between shaft hubs is such that when spacer is compressed to eliminate gap, it slips into the space between hubs.

After positioning, angular alignment is checked with a dial indicator by placing it on one shaft hub and rotating latter 360 deg. while taking readings from the other hub-face. Alignment may also be checked with an inside micrometer by taking readings at 90 deg. intervals between hub faces.

Parallel alignment is checked by placing the dial indicator on one hub, and rotating it 360 deg. while taking readings from the outside diameter of other hub. Or a straight edge may be placed across both hubs to check alignment at 90 deg. intervals.

To disassemble the unit, all but two cap screws (one in each hub) are removed. Then these are loosened

"Eheu, fugaces labuntur anni!"

Today, at Dicalite, we would translate that, very broadly indeed, "Good Heavens! Twenty-five years gone by so soon!" For, as we look back to 1930 and our beginnings, we feel a double sense of wonder . . . first, that a quarter-century has sped so fast, and then, that we (and diatomite) have come so far in so short a time.

As you know, Dicalite is both our Division name and the family name of a whole host of materials processed from diatomite. This unique material, once regarded as almost an oddity, used occasionally as 'chalk-rock' building stone or in fire-lighters, today serves important uses in more than 200 industries.

This great expansion is due, in no small part, to the warm cooperation of the industries which we serve. Their laboratories have worked with ours, their product engineers and ours have together pioneered new developments, new uses, for this versatile earth.

Hence, we would like to make this, our 25th milestone, an expression of thanks to the many industries throughout the world whose ready acceptance and continued use of Dicalite have made possible our growth. Their support has enabled us to advance from 1930's one deposit, one plant, to our present four deposits and four processing plants. Our obligation is cheerfully assumed and Dicalite will contribute even more greatly to industry's progress during our next quarter-century.

1930 • 1955
25
YEARS

Dependable GLC GREAT LAKES Dicalite®
DIATOMACEOUS MATERIALS

P.S. *The cryptic headline is from the Roman poet Horace (Odes II, xiv. 1). Its literal translation is "Alas, the fleeting years glide by," but we cannot echo the poet's expression of regret.*

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

reach a new peak with YARWAY

in spraying efficiency non-clog nozzles

cone spray

Most popular design for cooling, recooling, washing, rinsing, air conditioning, drying and other spraying operations in industrial and processing work and in power plants.

Non-clog involute design has no internal parts (vanes or deflecting plates) on which foreign particles can collect. Special contour of nozzle body guides flow with minimum loss of energy towards discharge opening, where liquid attains maximum velocity and leaves nozzle in a fine hollow-cone spray.

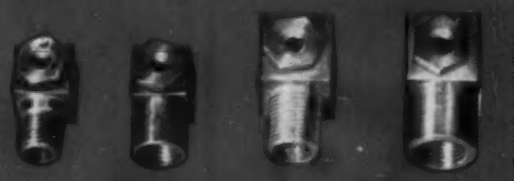
Available in three types:

Bar-stock bronze (shown) for fine spray
Sizes ¼" and ⅜", male or female connection
Capacities up to 3 gpm; pressures 20 to 50 psi

Cast bronze Type B (shown) for air conditioning and small recooling systems
Five sizes, ⅛" to 1½"
Capacities up to 40 gpm; pressures 7 to 25 psi

Cast bronze Type C (not shown) for spray pond service
Sizes 2" and 2½"
Capacities up to 110 gpm; pressures 7 to 15 psi

Write for YARWAY Spray Nozzle Book N-617; it gives capacities, dimensions and application information.



YARWAY Bar-Stock Involute Nozzles

YARWAY Type B Involute Nozzles

fan spray

Preferred for many washing and cooling operations. Non-clog design, delivers flat fan-shaped sheet of spray with slicing action particularly desirable for surface washing.

Thin sheet of spray is discharged forward 30° from the vertical, spreading in fan shape up to 140°, depending on operating pressure.

Made of bronze, steel or other bar-stock metals, male thread, six sizes ⅛" to 1", capacities up to 7 gpm, pressures up to 50 psi.

Write for YARWAY Spray Nozzle Book N-617.

YARWAY Fan-Spray Nozzles

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY® spray nozzles

about ¼ in. and tapped with a mallet to disengage the spacer from the shaft hubs.

Only maintenance required is greasing about every six months. And coupling covers are fitted with flush-type fittings for simple lubrication.—*Falk Corp., 3001 W. Canal St., Milwaukee 8.*

Circle 146A on Reader Service Card

Fork Truck Attachment Eliminates Pallets

This hydraulic carton clamp, designed for palletless handling of a wide variety of carton sizes, saves time formerly required in palletizing loads and permits more effective use of storage space.

Available on a complete line of fork trucks, it eliminates the problem of loading and unloading pallets when material is received or shipped. Also avoided or markedly reduced is the usual investment in costly pallets and skids.

A variety of clamp arms permits handling of nearly any product from solid cartoned merchandise, such as canned goods, to cartons of noodles, egg crates or other fragile items.

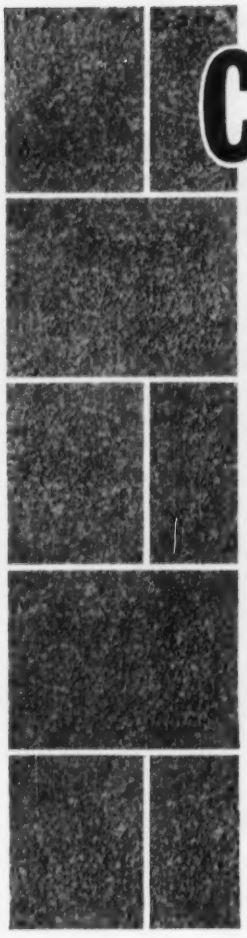
In addition to the clamping feature, a side-shifter can be provided for accurate spotting of loads. This device is recommended for loading cars or trucks in crowded areas.—*Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3.*

Circle 149A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.



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For close to half a century, United Cork Companies' products and services have been geared to the needs of refrigeration engineers and plant operators. This experience assures the satisfactory performance of *your* BB Corkboard installation . . . today and for years to come.

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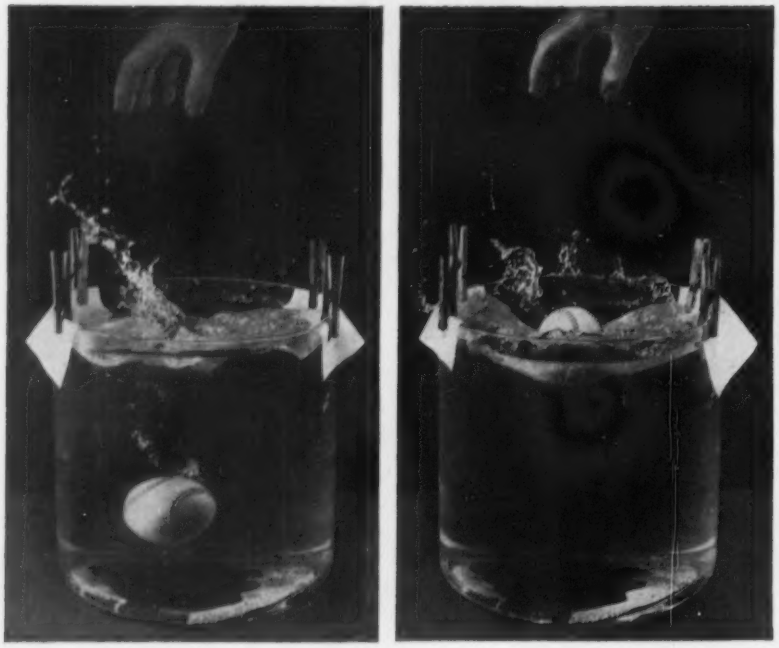

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In other fields, Patapar has won praise as a release liner for tacky substances, as a translucent master sheet for direct print copy machines, as a dialyzing membrane, as a release backing for polyester film, and in hospitals for wrapping articles to be sterilized in live steam.

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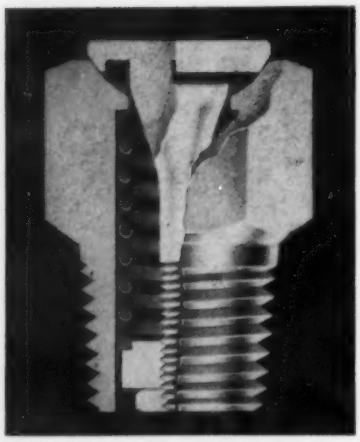
Equipment & Supplies

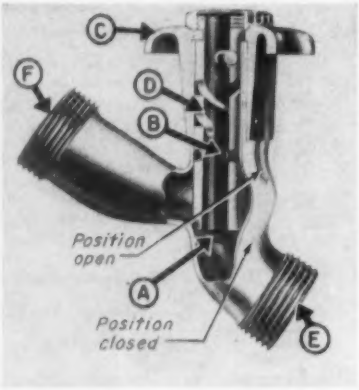


Pop-Off Relief Valve

Described as simple, sturdy, and of trouble-free construction, this relief valve seals tight with no leakage below release pressure. Recommended for pressures from 1 to 125 psi., seal is provided by a resilient member fitted into the poppet head that seats into a spherical section in the valve body.

When in the closed position, metal-to-metal seating limits the compressive load on the resilient seal and contains it to withstand the pressure. Spherical valve seat eliminates need for close stem alignment and troublesome, close siding fits in the sealing area. Adjustment is internal, protected and cannot be tampered with. Reseating is dead tight within 10% of this valve. —*James-Pond-Clark Co., 2181 E. Foothill Blvd., Pasadena 8, Calif.*

Circle 150A on Reader Service Card

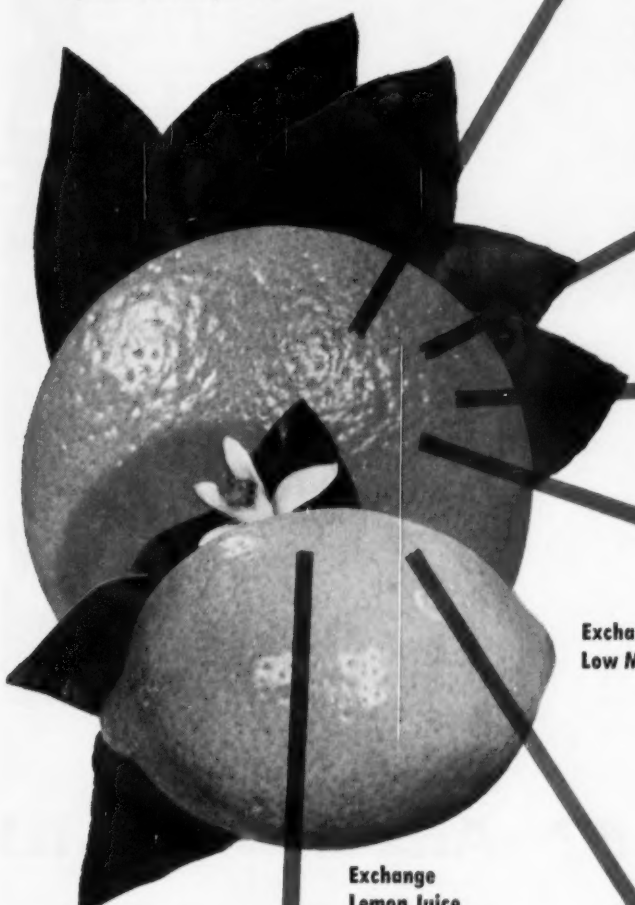


Seatless Sanitary Valve To Ease Maintenance

Of interest in all branches of the food industry is a new seatless sanitary valve that features easy disassembly for cleaning and low replacement cost.

Look to Sunkist
for progressive research in food processing

Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

Sunkist Growers

Exchange ®

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Equipment & Supplies

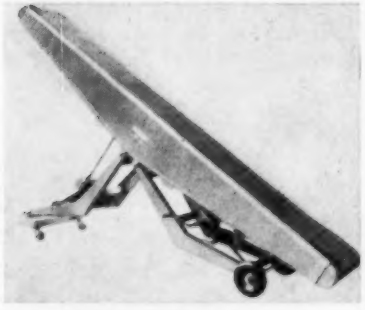
Called the Hemco valve, it produces a complete seal by action of an O-ring and sock. These are the only wear points of its construction. And interchangeability eliminates stocking of many spare parts.

Operation of the 1½-in. valve is shown in photo. When valve is closed (as shown), and poppet is in Position A, O-Ring sock (A) seals outlet side of valve. And O-ring (B) seals the tubular neck of valve body. To open valve, knob (C) is rotated counterclockwise, which retracts poppet (D) to the open position, thereby leaving open a full flow, non-turbulent passage from (E) to (F). To close valve, knob (C) is rotated clockwise to "stop," or back to position A.

Only two valve body types, line and angle, are necessary to complete most installations. Angle valves, which are self-draining, serve a dual purpose since they also can be used for tank installations, either in horizontal or vertical position.

Another advantage cited for this unit is light weight, an important factor where glass lines are used or where lines are hung. In addition, it can be operated by solenoid, air, vacuum, hydraulic or other remote controls. Valve is available in stainless steel, Inconel, Monel, brass, aluminum and alloys, and fits any standard connections.—*Hurt Corp., 997 S. Marengo, Pasadena, Calif.*

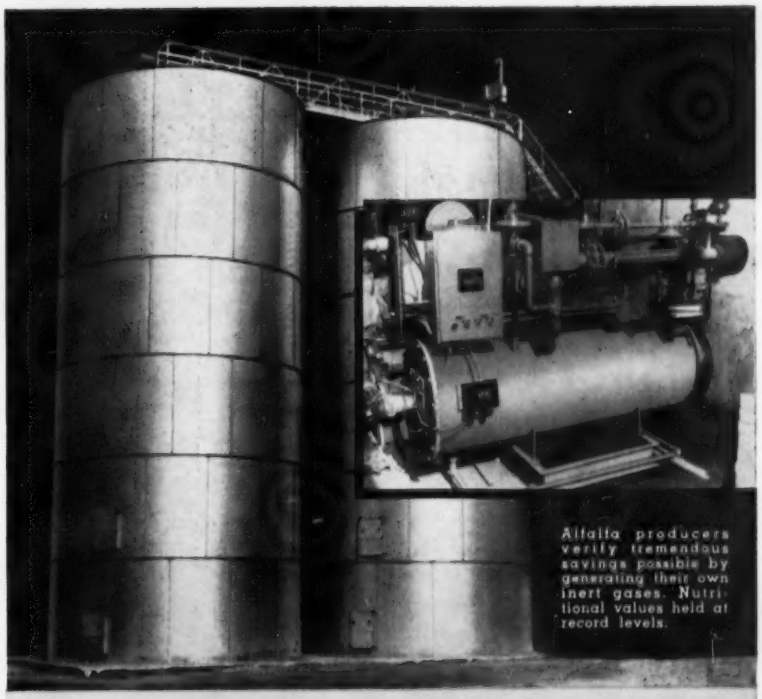
Circle 150B on Reader Service Card



Portable Belt Conveyor Raises at Either End

To speed loading and unloading of trucks and railway cars, this new portable, power-belt conveyor is designed to be easily moved and quickly set up by one man.

Called Speedlift, it raises and lowers independently at either end. And with each supporting leg adjustable, the unit may be inclined to a 30-deg. angle. Additional features: Light weight, positive belt tracking, start-



Alfalfa producers verify tremendous savings possible by generating their own inert gases. Nutritional values held at record levels.

GAS BLANKETING FOODS IN PROCESS...

Processors in many food fields see economy, flexibility of inert gas—push use of system

The food industry will consume more inert gas this year than ever before. The expansion of dehydration processes, the trend to package more foods free of oxygen, the desire of food processors to retain greater nutritional content in their product have all contributed to the wider use of inert gas.

But, perhaps the biggest reason of all is the economy and flexibility of modern day individual inert gas generation systems. In almost every case, where the processer has looked over the various ways he can keep oxygen away from his product he has settled for gas and his own generation equipment.

In no other way can an inert or nitrogen gas user get gas at such low, low rates as he can when he makes it himself with a Gas Atmospheres' Generator.

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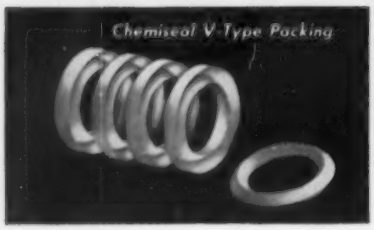
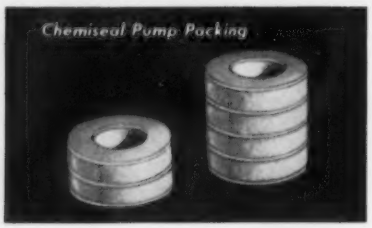
CHEMISEAL TEFLON-JACKETED GASKETS are available in any size, with a variety of filler materials suitable for glass, glass-lined, porcelain-lined and metal piping and equipment. These fillers are protected on both faces and the inside diameter by the inert TEFLON Jacket. Catalog No. TG-953.

CHEMISEAL SNAP-ON GASKETS are molded to match contour of conical-end glass pipe. They assure perfect automatic centering of joints and free flow of materials. Made for all standard pipe sizes from ¼ in. to 6 in. Catalog No. TG-953.

Chemiseal Teflon-jacketed Gaskets

Chemiseal Snap-on Gaskets


Chemiseal V-Type Packing


Chemiseal Pump Packing

CHEMISEAL V-TYPE PACKING is the ideal valve packing that seals with low gland pressures and operating torque. Extremely resilient, tough and anti-hesive—it will not seize the valve stem or shaft even when handling the most difficult solutions. Supplied in sets with square end adapters. Catalog No. TP-1053.

CHEMISEAL PUMP PACKING is extremely effective for rotating and reciprocating shafts. Provides a low friction 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements. Catalog No. TP-1053.

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stop-reverse switches, controls at both ends, and a 350-lb. capacity when inclined.

When this conveyor is used in a horizontal position, it is termed ideal for various off-level handling problems. These include bridging from platform to platform or car to car. For this, both legs can be adjusted to bring the unit from a maximum horizontal height of 61 in. to as low as 22 in. from the ground. Capacity of the conveyors in horizontal service is 500 lb.—*Speedways Conveyors Inc., 202-08 Rhode Island St., Buffalo, N. Y.*

Circle 153B on Reader Service Card

Versatile Unit Cleans With Power, Speed

Increased suction power and simultaneous wet and dry pickup without change of internal parts are features reported for this new industrial vacuum cleaner, called the Jet.

Applications for this machine include: Cleaning of floors, walls, ceilings, machinery, and boilers; picking up dry and wet spillage; and emptying stopped drains.

Unit's high suction speed is attributed to its specially designed aerodynamic fan chamber which is powered by a 1½ hp. motor. This produces suction measured at over 350 mph. (with ¾ in. nozzle opening) and a water pickup rate of approximately 40 gpm.

Other features: Large filter bag, easy-open lid clamps, rust-resistant 12 or 50-gal. tank, easy rolling, self-lubricating rubber casters, and self-lubricating continuous duty by-pass motor. —*Lincoln-Schlueter Floor Machinery Co., 1250 W. Van Buren St., Chicago 7.*

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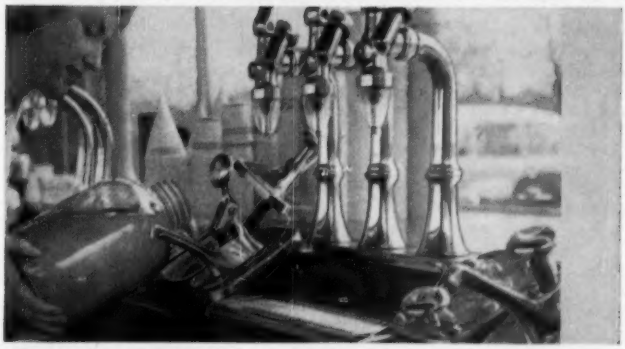
DOW PROPYLENE GLYCOL, U. S. P.

EFFECTIVE SOLVENT FOR A WIDE RANGE OF MATERIALS



. . . to help you improve food flavors and extracts, flavor concentrates and food colors

There are many reasons why Dow propylene glycol, U.S.P., has gained wide acceptance in the flavoring industry. It offers more efficient solvent action and extends this effectiveness over a broader range of flavoring raw materials. It is dependable in quality, and delivery is prompt—and there's a better than even chance for economy in manufacture through replacement of your present solvent.

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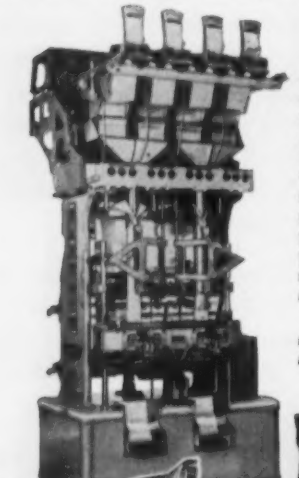
See it in Operation—AMA-NPE show, Chicago, April 18-21—Booths 1167-1171



HAYSSEN "COMPAK" packages anything: Solids, Liquids, Semi-Liquids and Powders...

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For use with the COMPAK, Hayssen has an extremely accurate, heavy-duty Scale Feed and improved Volumetric, Auger, Pump Feeds.

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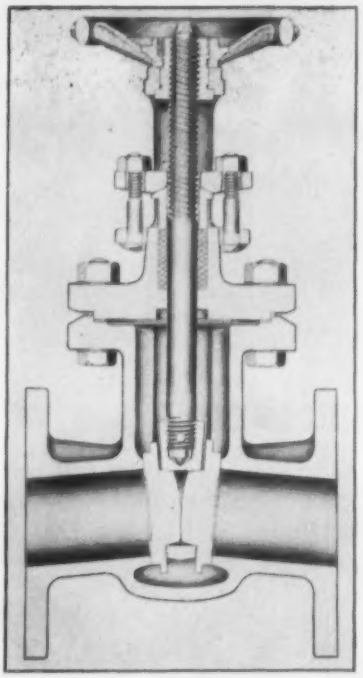

Tight-Seating Valve Has Unique Disk

Outstanding features of new line of alloy gate, globe, and angle valves are a new split-wedge disk design in the gate valve, and an improved disk-stem connection in the globe and angle valves.

Split-wedge disk in the gate valve consists of two identical, circular disks placed back-to-back in a carrier. They have a convex trunnion on the back and an integral circumferential flange which bears on drive slots in the valve body. Since seating load is uniformly distributed over both disks, excessive force is not required for tight seating, and there is no danger of buckling the disks. This uniform pressure, plus freedom of the disks to rotate, is highly effective in reducing seat wear and preventing galling of seating surfaces.

In the new globe and angle valve disk-stem construction, the stem extends much farther into the disk, with a minimum amount of radial clearance. Chattering of the disk is eliminated and seat wear is reduced.

All valves are furnished with stainless steel bolting. In screwed ends, sizes are ¼-2 in., and in flanged ends, ¼-6 in. inclusive. Materials in which the new valves are available are 18-8S Mo stainless steel and high-nickel, high-chromium stainless steel. Teflon packing is used in all valves.—*Crane Co., 836 S. Michigan Ave., Chicago.*

Circle 156A on Reader Service Card

New Chemicals

Non-Slip Floor Wax Gives Gloss Finish

Lower cost floor maintenance and improved appearance of surfaces exposed to heavy traffic are features of a new water-based floor wax, called Super Westwax. In addition, this product has non-slip properties—an important safety factor.

Fortified with a durable and transparent emulsion, it also contains prime yellow carnuba wax which dries to a hard, lustrous finish without buffing or polishing. Since this product contains a high percentage of solids, a single application is said to be adequate in many cases.

Along with high resistance to wear and water spotting, it provides a tough protective film that does not discolor floors. Occasional damp mopping with plain water restores the finish, and a high luster may be achieved by subsequent buffing or polishing.—*West Disinfecting Co., Long Island City, N. Y.*

Circle 157A on Reader Service Card

Corrosion Resistance Marks Rigid Plastic

For applications in which temperature does not exceed 140 F., valves and pipe fittings of unplasticized polyvinylchloride (PVC) offer high corrosion resistance, easy maintenance.

A new molding technique now permits use of pure PVC without fillers and plasticizers, which reduce the plastic's natural chemical resistance and mechanical strength. And it produces a non-porous, smooth surface that is easily cleaned. Thus, units are free of mold, rot and other deterioration caused by microorganisms. — *Stokes Molded Products Div., Electric Storage Battery Co., Taylor & Webster Sts., Trenton 4, N. J.*

Circle 157B on Reader Service Card

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the NEW HAYSSEN ACCUMULATOR and BUNDLER SAVES YOU

TIME, PACKAGING COSTS, LABOR and MAINTENANCE

Regardless of size or shape, you get a neat, tight wrap on every package with a Hayssen Automatic Accumulator and Bundler. Wrapping's easier—saves time! Also, production men report savings up to 80% over previous wrapping costs.

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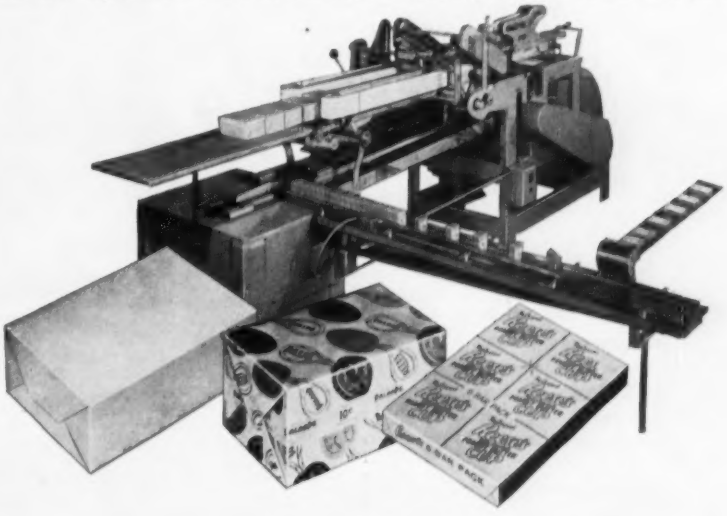

Hayssen's simple, rugged design, using fewer moving parts, and heavy-duty construction, keeps these machines working and saving through years of dependable, trouble-free service. Every moving part is in the open and easily reached for maintenance and cleaning.

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How dough mixer saves dough
with TIMKEN® bearings on agitator shaft

BAKER PERKINS mixers not only produce exceptionally smooth and lively sponge but save money by reducing maintenance costs. One important reason: Timken® tapered roller bearings are used on the agitator shafts.

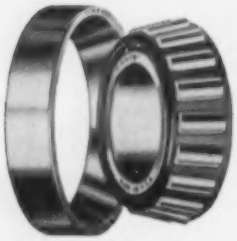
Timken bearings easily take the heavy load of the full bowl (up to 1600 lbs. of dough in largest model). Full line contact between rollers and races of Timken bearings gives them load-carrying capacity to spare. The true rolling motion and smooth surface finish of Timken bearings practically eliminate friction, further reducing maintenance and wear.

With Timken bearings, there's no chance of leaks contaminating the dough as it's mixed. Timken bearings are made with extreme precision. They hold housings and shafts concentric, making closures more effective. Lubricant is sealed in, dirt is sealed out. Maintenance is minimized.

Make sure you specify Timken bearings in the machines you build or buy. They give longer life with less friction. To make sure Timken bearings are made of the finest steel available, we make our own. We're the only U. S. bearing manufacturer that does. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

BAKER PERKINS mounts the agitator shafts of its dough mixers on Timken tapered roller bearings to reduce maintenance costs, insure long life.



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TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION

Bakers Sift Techniques

—*Continued from page 117*

dewpoint of the atmosphere, condensation will take place.

For best results, pies should be defrosted to 40-45 deg. F. in a 70-deg. F. room.

Making Frozen Cake Batters

Orville Pickens, Wilson & Co., Inc., Chicago, pointed out that there are a number of possibilities in commercial production of frozen cake batters. He recommended depositing the batter in foil trays then freezing, followed by freezer-room storage of the packaged batter prior to baking.

Necessary, too, are adjustments in cake-batter formulas and mixing procedures. Advised is addition of ¼% more baking powder to the formula. And by whipping more air into the batter, it takes less time to freeze batters. It's also found that it takes longer to bake frozen batters.

For example, it took 20 min. longer to bake frozen pound cake at the required lower baking temperature (25 F. under regular practice with fresh batter). And frozen devil's food cake took 16 min. longer to bake at 350 F. than the regular.

Big problem with frozen cake batters is precise control of temperature in freezer-storage room (at 0 deg. F.). Variation in storage temperature adversely affects volume, grain, and texture of the baked cake.

A 5-6 weeks turn-over is satisfactory.

Selecting the Package

As for packaging partially or fully baked goods, Stan Ellis, Marathon Corp., Menasha, Wis., suggested adoption of a package that adequately protects the product and stacks well.

Recommended was a waxed carton with a printed, waxed paper overwrap.

Carton suggested is one manufactured from Fourdrinier board. Because it has no grain direction, this board doesn't warp or curl. Being stiff, it is suitable for automatic, high-speed packaging operations.

Carton material is of a 30-lb. ream weight, finished to 44 lb. The 30-lb. base sulfite sheet is coated on top with 3-4 lb. of wax finish and 2¼-3½ lb. of wax on the bottom.

Mr. Ellis did not recommend using a window-type carton. Reason is that most transparent films for windows shrink from the carton during freezing, then become brittle and shatter. Also the adhesive may freeze causing the film to come loose from the carton. Frost will also accumulate on inner surface of film, with resulting loss in product visibility. And since eye-appeal is not of the highest in baked goods in the frozen state, there is less need of providing visibility.

He saw no ready market for frozen breads in the near future.

Extensive tests were reported on bread freezing by J. W. Pence, USDA, Albany, Calif. Here are key points:

Freezer temperature is the most important variable affecting freezing rate of wrapped bread. As for unwrapped bread, air velocity and position of loaves on racks are most important.

Freshly baked unwrapped bread can be frozen relatively rapidly and without significant moisture loss.

Rates in defrosting frozen loaves are influenced by air temperature and humidity, since both affect the air's heat-carrying capacity. In addition, duration of exposure to defrosting conditions affects moisture changes at the surface of unwrapped bread.

Advised is freezing of bread as soon as possible after leaving the oven, then rapidly defrosting it. Breads so processed were judged satisfactory by physical and taste-panel tests.

Freezing time affects crumb firmness more than defrosting time.

At a maximum storage temperature of 10 deg. F., frozen bread should not be held more than a week. But 0 deg. F., or lower, is suitable for storage.

Frozen bread stored for more than 1-2 days should be wrapped in sturdy, moisture-resistant material, flexible at low temperatures.

Curbing Process Snags

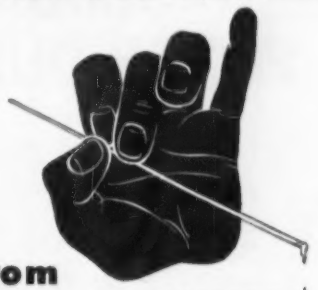
In discussing mixing operations, Clayton Daley, Alfred Nickels Bakeries, Inc., Navarre, Ohio, summarized that: (1) Age of sponge will affect optimum mixing time; (2) critical mixing time will be cut by reduction in absorption, (3) mixing time must be balanced when the dough is made leaner or richer (more mixing for richer, less for leaner); (4) time is reduced by increasing mixing speed; (5) time also is cut, and dough cooling and absorption may be aided, by holding out the salt; (6) floor time is increased by stepping up mixing; and (7) removal of dough from a mixer should be controlled.

Of the six bakeries that used, or experimented with, the continuous dough process, only two now still employ it. One of these is producing 15,000 lb. of dough per day.

J. F. Schuster, Emirgh Baking Co., Minneapolis, reported that freshly milled—or "hot"—flour had enabled his firm to slash inventory and storage-space requirements.

As for storage space, it has been reduced about a half—from about 1¼ to ¾ carloads. As a matter of fact, if it

FOAM'S a FUGITIVE



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- *4 ppm defoam paper sizing*
- *.07 ppm defoam vat dies*

The more easily dispersed Antifoam AF Emulsion and its parent product, Antifoam A Compound, are physiologically harmless. Effective at low concentrations against the widest variety of foamers, they pay for themselves many times over.

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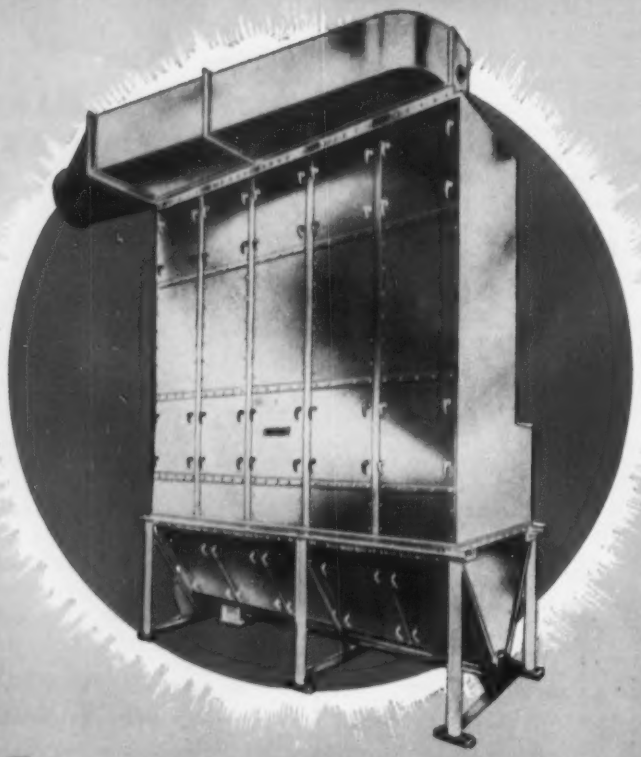


Re-designed and streamlined...to keep in step with modern milling practice! Each section now contains 190 square feet of filter surface in place of 127 square feet . . . yet occupies the same amount of floor space. In addition to its streamlined efficiency, the Simon Suction Filter Dust Collector still contains *all* the outstanding features which have made it a leader in its field . . .

COST...per sq. ft. of filter area is lower.

UNIFORM AIR FLOW...each filter sleeve group is automatically cleaned.

HIGH AIR TO CLOTH RATIOS....5 to 15 CFM per square foot of cloth area.

LONG FILTER CLOTH LIFE...frequent vertical agitation of the sleeve assemblies assures thorough cleaning with minimum flexure.

LOW POWER REQUIREMENTS...only ¾ HP required for cleaning filter surfaces and operating collecting conveyor and rotary seal.

ALL ALUMINUM CONSTRUCTION...provides ease of cleaning and minimum maintenance...all collecting ledges are eliminated and all parts are easily accessible.

YOUR BEST BUY IN DUST COLLECTING EQUIPMENT!!!

ENTOLETER DIVISION
The Safety Car Heating and Lighting Company, Inc.
1187 Dixwell Ave., New Haven 4, Connecticut

weren't for the low ceiling limiting the handling of Tote Bins, even less floor space would be needed.

However, he did report a slight drop in yield of baked loaves.

His company's bread baked from freshly milled flour is consumed within 5 days after flour leaves the roller mills. Under average conditions, flour is held about 6 weeks in the bakery. Average minimum storage is 2 weeks and maximum 8 weeks.

Freshly milled flour is loaded into sealed, insulated Tote Bins at 86 deg. F., for example, to arrive 2 hr. later at the bakery at the same temperature. In this case, temperature of flour after pneumatic conveying to the mixer is 77 F.

Changes are required in the use of hot flour for sponge-making. Mixer is operated a minute longer than with regular aged flour. Since hot flour is higher in moisture, a 2-3% decrease in absorption is best for good make-up operations and bread quality.

Salt is also held out of the dough for one-half of the mixing time. Then, 3½ min. after clean-up, the dough goes into troughs for a 45-min. floor time.

No changes are necessary during final proofing and baking.

But there's a problem for the baker who is not in or near a milling city. Since hot flour must be used within 5 days after milling, the baker must be able to receive it within about 2 days, or he can't use it.

Mechanizing the Bakery

In a discussion of automatic bakery equipment, John Wagner, American Stores Co., Philadelphia, stressed the need for designing plants with adequate capacity for potential future sales increases.

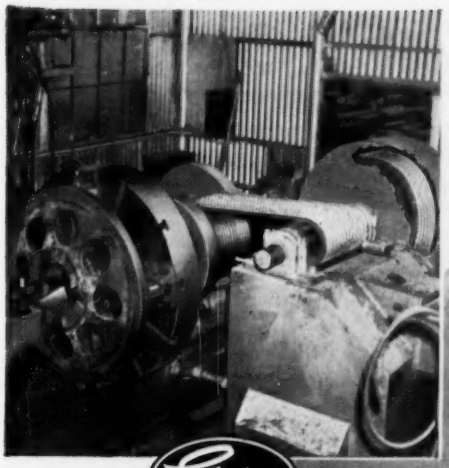
Bakeries should also be built so that future expansion can be carried out economically and without work stoppages. Savings in operating efficiency and assurance of product quality should justify installation of new equipment within 3 yr. but not over 5 yr.

As an example, Mr. Wagner compared the number of loaves of bread produced per man-hour in his firm's old bakery with output of the new "pushbutton" bakery. The old produced 300 loaves per man-hour, the new 1,000.

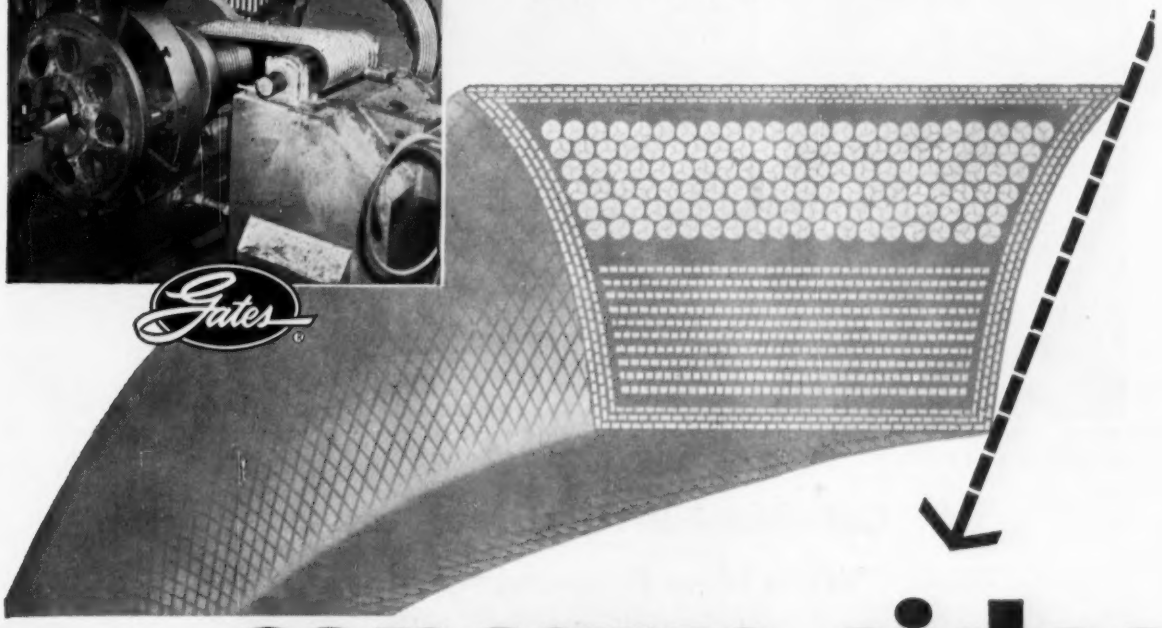
Broken down by departments, man-hour production figures are:

Dough-mixing department, 1,250 lb. of dough in old bakery, 4,250 in new; in make-up department, 667 lb. in old, 2,333 lb. in new; in wrapping department, 571 loaves in the old, 3,500 in the new.

End (Resume reading on page 118)



The smooth, positive flow of power transmitted through Gates Vulco Ropes enables this large engine lathe to handle quickly and efficiently many tough oil field repair jobs.



How concave sides cut V-belt costs!

Plants all over the world have made this discovery: Gates Vulco Ropes—the V-belts with *concave sides*—wear longer; cost less per year of service.

Here is the interesting reason why:

When the Gates Vulco Rope is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and *even distribution of wear.*

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

It's easy to prove to yourself the value of concave sides

Simply bend a straight-sided belt (Fig. 2) and *feel* the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt costs.

Cut belt replacement time and costs...specify Gates Vulco Ropes—the V-Belt with *concave sides* (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-30-A-G

GATES VULCO ROPE DRIVES

For more information, use coupon on last page.

NEW PACKAGES & PRODUCTS

MEAT is dipped in preservative and air dried to hard casing.

HARD DRIED CASING protects meat from shrinkage and discoloration as evidenced in comparing dipped meat above (left) with untreated meat.

Cuts Meat-Product Moisture Loss With New Preserving Film Dip

Wasteful shrinkage with ready-to-use meats caused by moisture loss is reported curbed with use of a new film preservative perfected by Tee-Pak, Inc., Chicago manufacturer of cellulose and plastic film casings. Called Tee-Pak Dip 77, the preservative is a tasteless white liquid.

The prepared meat (Canadian bacon, bacon, butts, sausage, bologna, or salami) is immersed in the dip and allowed to dry. A tough, transparent coating forms on the food. The coating, which makes the meat substantially moisture proof, may be peeled off, but provides a tight-clinging, elastic casing when intact. It clings with absolutely no voids, according to the manufacturer, and remains intact under normal handling.

The loss of weight in Canadian bacon varied widely when encased in either standard casings or Tee-Pak Dip 77. The standard casings showed a loss of 11.4% after ten days, while the dipped meat lost only 2.10%. Discoloration was also delayed when the products are dipped.

In processing, the dip is applied only after the meat has been cooked or smoked, since the preservative disposes of the permeable quality of the casing. After dipping, the excess is drained off and the product is air dried.

The manufacturer has been working with various equipment manufacturers and will recommend equipment for any specific production level. The maker estimates that the product can be paid for with the first two days of shrinkage savings on the average package. The dip has been approved as an artificial casing by the Meat Inspection Branch of the USDA. Patents have been applied for.

New Casing for Meat Loaves

Tee-Pak has also introduced a new pliofilm casing for meat loaves. It is offered in a single-wound, 120 gage pliofilm, and a 75 gage double-wound. The latter employs the Unilox printing method in which ink is laid down between two plies of film. This prevents scuffing and scratching of the label and gives an attractive third dimensional effect.

The pliofilm casing does not require soaking or a hot water dip after stuffing. Stretched when applied, the film possesses a high degree of elastic memory and attempts to return to its original shape once the meat has been inserted.

The casing is available with both a sealed or open end, and in various diameters. The sealed end is economical in that it eliminates the need for pre-tying by the packer.

Circle 162A on Reader Service Card

Five No-Cook Items Spark Line for Bakers

All popular in the American kitchen, five new convenience foods have been released by Pillsbury Mills. Two frosting mixes (creamy fudge and frosty white) and three baking mixes (party orange cake, crunchy peanut cookie, and fudge brownie) comprise the quintet.

The fudge frosting mix is a blend of extra-finely powdered sugar, a special cocoa, salt, and flavoring. Butter or margarine and water are added to the dry mix, then it is beaten until smooth. The finished frosting has a rich, buttery flavor, and smooth fudge consistency. One package will frost

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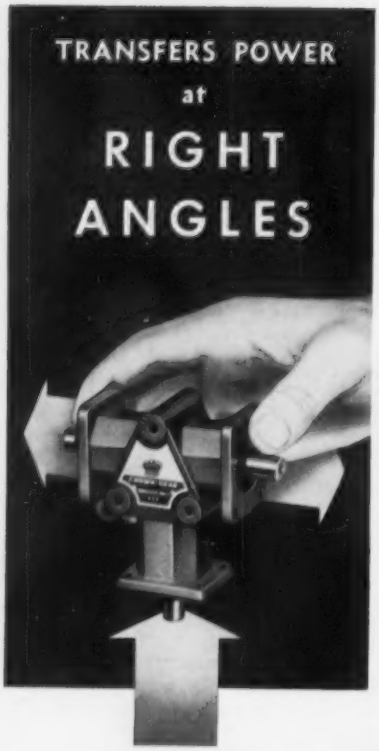

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a layer cake or 24 cupcakes. The frosting may also be served as a dessert, sauce, or syrup by varying consistency.

The white frosting is packed in two envelopes, one with egg white and the other with sugar mixture. Boiling water is added and the mixture is beaten. Yield is the same as the fudge frosting.

A speedy but tasty cake may be whipped up in minutes with the use of Pillsbury's party orange cake mix. The mix contains tiny orange crystals that impart the taste and aroma of the fresh fruit.

A two layer cake, a loaf, or about 24 cupcakes may be made from each package.

Eighteen large fudge brownies may be made with Pillsbury's 16-oz. carton of brownie mix. Consistency may be varied to please individual tastes.

A small packet of chopped nuts is included in the baker's peanut cookie mix. Each 13½-oz. box yields about 30 cookies.

Restaurateur Packs Coffee

Soluble in either cold or hot water, an instant coffee is being marketed by Schrafft's Stores under their label. The result of extensive experimentation, the coffee is reported to have a flavor that closely approaches that of ground coffee.

The quick-soluble feature of the product also makes it ideal for flavoring desserts. The coffee is made of 100% pure coffee.

Cheese In Dispenser Pack

Packaged in a flexible, dispenser-type container, an instant cheese spread is being marketed by Woody's Cheese Co., Waupaca, Wis.

Product spreads easily in a ribbon-like flow from the specially designed spout of the package. This lends itself to many decorating possibilities for hors d'oeuvres. The laminated foil container is cut at the top and handled much like a tube of toothpaste—applying pressure from bottom and rolling up as used. To reseal, the spout is squeezed shut and folded over.

Windowed Can for Seafood

Steel and Tin Products Co., Baltimore, has announced full scale production of a plastic-topped can for oyster

and crab meat. Of clear, tough, plastic, the window gives perfect product visibility and adds to a display's sales appeal.

The cans are shipped with the window end sealed on, the packer need only seam the lid on. They are supplied in pint, 12 oz. and half pint sizes.

Circle 164A on Reader Service Card

Corn-Flavored Breading

Processors of frozen breaded foods may add a tasty corn flavor to their products by using a corn breading ingredient called Kor-Krums. Made by Maize Industries, Chicago, the fluffy, golden ingredient is also on the consumer market.

The Kor-Krums are made from refined cornmeal made with a special process which explodes the grain. The refining keeps the product free of gritty substances and yet retains the fresh corn flavor.

The breading ingredient is particularly effective with croquettes, seafood, chicken, and chops and other products that are breaded.

Circle 165A on Reader Service Card

Unique Flavored Sausage

Latest addition to Merkel Inc.'s line of pork products is Snow Goose Smoked Liver Sausage. The new product features a unique flavor that is the result of carefully seasoning and smoking with hickory wood. Package is a red, white and blue natural casing, with clips at each end. A loop of string at one end permits hanging of the sausage.

The colorful 8-oz. package is a natural for impulse buying. The product is smoother and finer than ordinary liverwurst, making it easy to spread.

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When you see this label on incoming drums you'll know your supplier has shipped in a new steel shipping container to protect his product from leakage and contamination . . . assure you top product quality and uniformity. You *know* when you receive a new steel container bearing the "Red-S" label of the Steel Shipping Container Institute that it's manufactured and tested to comply to the exacting regulations of the Interstate Commerce Commission and Bureau of Explosives. So next time you place an order for a drum-shipped product, be sure to specify that you want it shipped in a New Steel Container.

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Seasoned Cheese Dip

Circle T Meat Co., Dallas, Texas, has added another item to its line of frozen Mexican specialties—chili con queso. The product is a highly seasoned cheese dip comprised of cheese and pure cream, tomatoes, onions, garlic, and Jalapeno peppers.

The cheese dip is packaged in a 5-oz. aluminum foil container that can be used for heating and serving. Outer package is a brown, yellow and red carton. The package serves two people.

Plastic Can Re-closures

Snap-on polyethylene covers for No. 10 cans are being manufactured by Eldon Mfg. Co., Los Angeles. Directed at reducing waste, contamination, mold, odor transfer, and preserving flavor, the caps are of particular benefit to the institutional or restaurant trade. Lids are washable and may be reused. They may be obtained in any color and may be imprinted with advertising data.

Circle 166A on Reader Service Card

Brewer to Process Pop

A line of six carbonated soft drinks in cans will be processed by Pabst Brewing Co. Using the label Pabst Sparkling Beverages, the products will begin distribution in six Midwestern states early this month. Flavors are cola, root beer, ginger ale, orange, lemon, and black cherry.

Packed in 10-oz. cans, the pop will be made exclusively from real fruit or root juices, with no preservatives or artificial flavors added. The cans will feature a harlequin design of varicolored diamond shapes lithographed in metallic links to make an eye-catching package

A flat-top can will be used. Tap-a-Cola, marketed by the brewer since April, 1954, will continue to be sold in the areas where it was introduced.

Salt and Pepper Packets

Sixteen individual packets of salt and pepper are contained in an attractive Lunch Box marketed by Durkee Famous Foods, Cleveland. A small green and yellow windowed carton holds the packets of cellophane laminated to paper. There are eight of each condiment. The packets are ideal for lunchboxes and picnics.

Clear Cello-Wrap for Bread

A sales boost of over 30% has been reported by Cottage Baking Co., Piqua, O., with use of a clear cellophane overwrap for their bread. No label band is used.

The wrap was adopted by the company after failure to sell the same loaf in two different opaque wrappers. There was no increase in expenses.

It is made of 300 MS-2 cellophane produced by Sylvania Division, American Viscose Corp. and has surprising rigidity. The bottom is heat sealed with an unusually wide two-and-one-half-inch overlap, adding greater lengthwise support.

Circle 166B on Reader Service Card

'Coke' in Cans

Coca-Cola will be packaged in cans for shipment to military bases in the Far East. For export only, the canned beverage will be processed at the bottlers Hayward, Calif. plant. Unusual marketing and production conditions are reported as the reason for the new package.

New Products Shorts

Low Calorie Cake Mixes

Duff's is marketing low calorie cake mix in both chocolate and golden layer. Less than one third the normal calorie count is claimed.

Corn Off the Cob

Frozen cream style corn is the latest product of Libby, McNeill, and Libby. The 10-oz. package holds three servings.

New Beer for St. Louis

Anheuser-Busch, Inc., is distributing Busch Lager, a new beer, in the St. Louis area. The product will be produced as a companion beer for Budweiser.

Home-Style Italian Meatballs

V. LaRosa & Sons, Inc., New York, have added Italian meatballs in sauce to their food line. Of the heat-and-serve variety, the product is packed in a handy 15½-oz. can.

From the Deep South

Catfish stew in a unique product being processed by Cushman Food Co., Aiken, S. C.

Third Television Dinner

Frozen beef pot roast dinner is the latest addition to C. A. Swanson's TV Dinner line.

—End—

Ticklish Labor Issues

—Continued from page 67

funds to unions, investment in union projects, and various borrowing. One fund bought $10,000 group life insurance policies for executives of employer concerns.

Further, there were instances of union officials being appointed as administrators, while continuing to draw their union salaries, and being left virtually free of control by trustees. And in most of the "bad" cases such administrators and union officials were getting a high portion of the benefits purchased. In fact, the officials of one fund spent as much on annuities for themselves as on those for the membership.

One administrator used $85,000 of his fund's $100,000 surplus to buy run-down buildings from his cousin for a "vacation resort." In the end, $165,000 was spent. And the fund went bankrupt.

As for high administrative costs, some of the "bads" ran up to 42%, whereas in well-administered funds

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WITH SANI-BRICK *INSTALLED* BY DREHMANN

Worn, cracked or rotted flooring raises hob with sanitary standards, skyrockets operating costs. Think twice, then, before throwing more money away on repairs and patchwork that, at best, provide only temporary relief.

Consider, instead, the advantages of settling your floor problem for good by converting now to long-life, trouble-free Sani-Brick installed by Drehmann. Drehmann—originator of brick flooring and the most experienced flooring contractor in the food field—has to its credit more than 9,000,000 square feet of Sani-Brick. Many of these floors, still sound as a dollar, have withstood 30 years and more of punishing, food processing treatment. What more convincing evidence could you ask of the long range economy of Sani-Brick Installed by Drehmann?

A floor-wise Drehmann Engineer will give you the details of how Sani-Brick can be laid right over your old worn floor with little or no interruption of production.

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the ratio was as low as 3 to 4%. When well-run, the ratio tended to decline as contributions increased. But the reverse was true in the poorly-administered funds.

Pertinent lesson: In all flagrant abuses, the employer trustees had virtually abdicated their functions; but where they were active and alert, the funds were well-administered.

End (Resume reading on page 68)

MSG's "Staying Power"

—*Continued from page 77*

Preference of panel members for one sample over the other was indicated by the highest rating. If the scores were the same, this was taken to mean that the taster had no preference. Here are the taste panel findings—

	Months —10 Deg. F.	MSG 0	MSG Percent .20
Haddock fillets	3	7.0	7.8
	7	7.3	7.8
	10	7.7	7.7
	12	7.5	8.0
	Ave.	7.3	7.8
		0	.25
Beef stew	4	8.4	8.8
	6	7.8	8.4
	9½	7.6	8.7
	12	7.8	8.0
	Ave.	7.9	8.6
		0	.20
Chicken-a-la-king	4	8.0	8.4
	6½	7.8	8.3
	10	7.6	8.1
	.2	7.8	8.1
	Ave.	7.7	8.2
		0	.20
Codfish Cakes	4	5.5	6.0
	6½	6.6	7.7
	10	7.1	7.3
	12	6.5	6.6
	Ave.	6.4	6.9
		0	.20
Rosefish fillets	4	6.4	7.8
	7	7.0	8.5
	10	6.8	7.1
	12	7.1	8.1
	Ave.	6.8	7.8
		0	.125
Clam chowder	3	7.2	7.6
	6½	6.8	7.6
	9½	7.4	8.0
	12	7.5	8.1
	Ave.	7.2	7.8

In determining percent of taste-panel preference, the number of people having no preference was divided equally between those showing a preference for the control (no MSG added) and those preferring the MSG-treated sample.

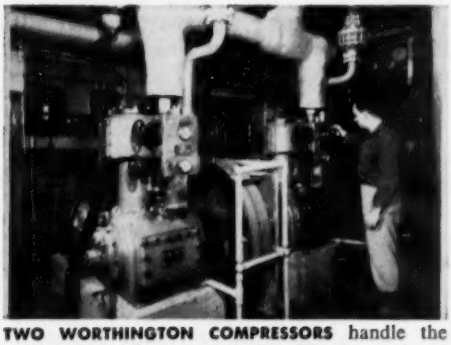
A comparison of palatability (acceptability scores) of the optimum levels and controls as a function of storage time is illustrated in our accompanying graph chart.

The above article is taken from the paper "Effect of Monosodium Glutamate On the Flavor of a Selected Group of Frozen Foods," which is Contribution No. 992 of the University of Massachusetts Agricultural Experiment Station, Amherst, Mass.

End (Resume reading on page 78)

IT'S COLD IN THERE. A rack of Dulany's asparagus is pushed into the freezing room at the Atlantic Ice plant in Bridgeville, Delaware. Fully automatic Worthington refrigeration equipment keeps the temperature at —5°F.

Putting the freeze on Dulany's asparagus



TWO WORTHINGTON COMPRESSORS handle the refrigeration job at Atlantic Ice. They're equipped with the exclusive Worthington Feather* Valve — the lightest, tightest, most efficient valve made.
* Reg. U.S. Pat. Off.

When Dulany, pioneers in the frozen food industry, leased the Atlantic Ice Manufacturing Company's plant in Bridgeville, Delaware, they picked the right place to freeze and store their products.

Main reason — Atlantic Ice depends on reliable Worthington equipment to handle their refrigeration jobs.

Two of the three storage rooms at Atlantic Ice are equipped with Worthington product coolers; the third uses flooded ammonia coils. Freezing temperature is kept at —5°F by two automatic Worthington vertical ammonia compressors, each rated at approximately 14 tons.

Like Atlantic Ice, more and more frozen food warehouses are finding in Worthington the right source for reliable, economical refrigeration equipment.

Get the whole story on the Worthington line. Contact your nearest Worthington district office or write to Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.4.55-FE, Harrison, N.J. A.4.55

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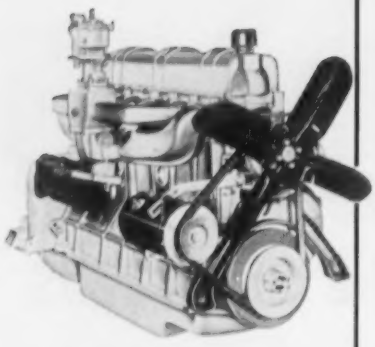

All-new 140-hp Black Diamond 264 engine combines famous INTERNATIONAL long life with new, economical sustained-power performance. Has new dual-barrel carburetor, new manifolding, 7.0-1 compression ratio—new low-friction design with 3-ring controlled-expansion pistons—new 50° ramp camshaft for longer valve life—new solenoid-type over-running clutch starter—new 11-inch clutch with 15% more lining area, 25% less pedal pressure. Maximum engine torque: 234 lb-ft at 2000 rpm.

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INTERNATIONAL® TRUCKS

"Standard of the Highway"

Innovating New Product

—Continued from page 101

So researchers abandoned their efforts to put the new mix into conventional form and into conventional packaging. They hit upon the idea of packing the new pie crust mix in quarter-pound sticks like butter.

New package designs using pliofilm and polyethylene protected the freshness and shelf-life. The mix needs no refrigeration, handles best at room temperatures, and stays fresh in the cupboard. New machines were adapted or designed to homogenize, extrude, wrap, package, and seal the protective parchment coated sticks. Expansion of production facilities was supervised by research specialists and plant engineers so national distribution could be accomplished in 1954.

The result: A new homogenized pie crust mix that looked different and worked different because it was different.

This article is based upon information in General Mills' publication, "Progress Thru Research." Photos courtesy General Mills.

End (Resume reading on page 102)

Impact-Type Flour Mill

—Continued from page 69

For regular production quantities when using large dough mixers—Sponge: mix ½ min. slow speed, 9 min. high speed. Dough: mix ½ min. low speed, 12 min. fast speed, or 1 min. after cleanup.

To make bread by straight-dough formula: Cream in the mixer brown sugar, 4½ lb.; salt, 15 oz.; milk powder, 2¼ lb.; and shortening, 1 lb. 14 oz.

Next mix in slower-speed mixer for ½ min.: Yeast, 2 lb.; water, 19 lb.; and Rotarized flour, 39 lb.

Then add: Water, 8 lb. and dough improver (dissolved in water) 2¼ oz.

Mix for 2 min. in 2nd speed and 5 min. at 3rd speed. Remove fairly stiff dough from mixer at 80-84 F. Age for 2 hr. and scale off 18-oz. pieces. Set for 10 min., then immediately roll into pans. Bake at 395 F. for 35 min. to produce 75 loaves. (1-lb.)

Caution: Soft water absorbs more flour—and flour, the longer it ages, picks up more water. For regular production of a straight dough, total mixing time approximates that above at the respective speeds.

End (Resume reading on page 70)

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For over forty-five years **NULOMOLINE®**—the *pioneer* invert sugar—has been used as a "BALANCING" ingredient by Bakers, Candymakers, Syrup Processors, Fruit Preservers . . . in frozen foods, desserts, icings, toppings, spreads, and other food preparations.

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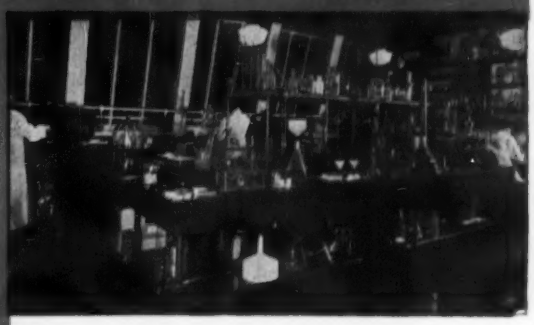

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ADVANCES IN TECHNOLOGY

Gamma Ray Sterilization

To estimate the degree of irradiation required for sterilization of food in tin cans using gamma rays, ground meat was cooked and filled hot in No. 2 cans (3⅞ in. x 4⅛ in.), then inoculated at center with spore suspensions of putrefactive anaerobe 3679 of NCA, and *Clostridium botulinum* 62A and 213B prior to sealing.

Cans were irradiated while rotating about a cobalt-60 source that delivered 85,500 rep per hr. at center of cans. Following irradiation cans were incubated at 98.6 F.

Sterility dosage for *Cl. botulinum* 62A was 2,500,000-4,000,000 rep when spore numbers were 0.4-40,000 per g. of meat. For meat containing 40,000 spores of putrefactive anaerobe 3679 per g. 2,500,000 rep were necessary. When strains of *Cl. botulinum* survived sufficiently to produce gas in the canned meats, toxins also developed—*Applied Microbiology*, Vol. 2, No. 6, 330-32, 1954.

Improved Cranberry Sauce

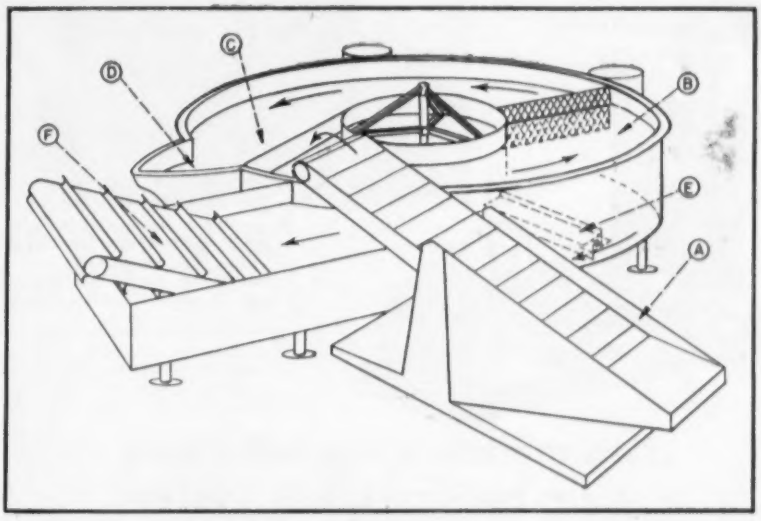
Performing a major part of the processing operation after ingredients are canned is characteristic of a recently patented method of packing whole cranberry sauce.

In the process, raw cranberries are ruptured and wilted by heat treatment, then mixed with an edible syrup and canned. Sealed containers are agitated and heated for a time and at a temperature sufficient to sterilize contents. This treatment simultaneously leaches out gelling material from the berries, distributes it through the syrup causing it to gel on cooling.—U. S. Patent 2,700,614.

Artificial Egg White

A process for converting milk whey to a liquid having the foaming properties of natural egg white has been patented.

In the process, whey is cooled to precipitate part of its lactose, then alkali is added to raise the pH to 11-12, followed by acidifying to reduce pH to between 9 and 10.5. These steps precipitate a large part of the lactose which is separated from the whey. Remaining protein solution is claimed to have heat coagulating properties of natural egg white—U. S. Patent 2,695,235.



Circular Washer-Sorter Saves Space, Eliminates Trimming, Inspecting Belts

Gentler handling of products and reduced floor space requirement are features of a combination washer-sorter for tomatoes developed in the laboratories of the National Institute of Food Preservers, Parma, Italy. Unit is seen applicable to other fruits and vegetables.

Tomatoes enter washer and are spray-washed on elevator (A) in diagram above. They travel counter-clockwise on circular table (B) past the trimmers and sorters, are removed by baffle (C) and fall into tank of water at lower level (D). High pressure jets, and reel (E), move fruit clockwise through wash tank. They are removed by elevator (F).

Also reported were results of experiments in which tomato juice was centrifugally separated into its two main constituents—pulp and hyaline liquid.

Pulp portion, which represents about 1½% of juice, is dense, brilliant red in color, has pleasant aroma. Without proper refrigeration (freezing) it quickly ferments, but color was unaltered after 6 months.

Hyaline liquid contains soluble solids and most of the original flavor. Condensing to 60-65% solids gave a product that remained chemically and biologically unchanged at room temperature for 6 months.

Suggested uses of the findings are: (1) Preparation of sauces and pastes of superior color by separating, concentrating liquid and recombining with the pulp; and (2) Obtaining brightly colored pulp for use in relishes, sauces, appetizers that require only the aroma and color of the tomato—Round Table Conference on Machinery, 9th International Exhibit of Food Preservers, Parma, Italy (McGraw-Hill World News).

Small Taste Panel Studies

Flavor assessment of food products by large consumer taste-panels, and by small groups of 3 or 4 expert judges, are not expected to coincide too well. But comparison of scores on oleomargarine and butter indicates good correlation between the two when the quality scored is easily understood.

Using a 7-point "graphic" scale rating of one point for "very good," two for "good," and so on, up to 7 for "very bad," oleomargarine, butter, and compound shortening were scored for flavor intensity, flavor quality, spreadibility, texture, firmness, and overall quality, by expert panels of 6 members, and by consumer groups of 27-118.

Correlation coefficients were significant at the 0.1% level for flavor quality and spreadibility; at 2% for firmness, and at 5% for flavor intensity. Texture and overall quality correlation was poor, and both groups found "overall quality" a difficult concept to score. For easier concepts, opinion of

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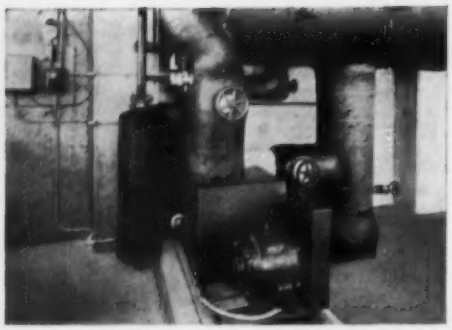

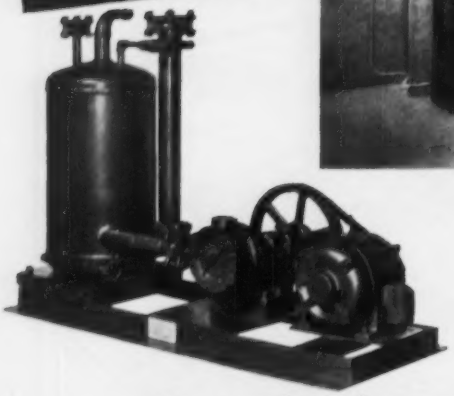

*A typical application of a complete Vilter Liquid Transfer System, in this case, an installation at the Golden Guernsey Dairy Co-operative, Milwaukee.

The Vilter Liquid Transfer assembly complete with motor, liquid pump and transfer drum for refrigerant transfer and recirculation.

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CHECK with VILTER

The Golden Guernsey Dairy initially encountered considerable difficulty in its ice cream plant, due to wet gas and slugs coming back to the compressors with a change in the refrigeration loads. Even the booster compressor had to be shut down occasionally. Constant observation and attention was required.

Vilter solved this problem by installing a suction drum which traps all slugs and wet gas, and a liquid transfer unit which returns this cold liquid ammonia to the receiver without going through the compressor. This system greatly improved the overall efficiency of the plant and particularly the efficiency and output of the compressor. Furthermore, it relieved the operator of a lot of worries. He knows now that no ammonia slugs can reach the compressors to cause damage.

With the Vilter Liquid Transfer System, unexpanded refrigerant cannot enter the compressor. Also, the entrapped liquid is rapidly and efficiently returned to the receiver. This system eliminates the high pumping heads required when only pumps are used. In addition, it eliminates the suction pressure rise noted on some transfer systems that are offered without power-driven equipment.

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the panel proved to be a reliable estimate of consumer opinion.

By careful selection of judges and elimination of panel members who make atypical or unreliable judgments, small panels should prove useful in cases where full-size consumer groups would be unwieldy or impossible—*Journal of the Science of Food & Agriculture*, Vol. 6, No. 1, 24-30, 1955.

Changes In Fish Eyes Show Time of Storage

A series of glass bulbs about the size of a fresh cod eye lens, made from 4 mm. glass tubing and filled with varying amounts of light magnesium carbonate suspended in a 50% glycerol-water gel containing 0.3% agar, gives a good approximation of codfish eyes at different times *post mortem*.

When mounted against a dark background and covered with physiological saline solution, these artificial lenses may be readily compared with dissected fresh fish-eye lenses.

By examining 20-30 eyes, storage time under standard conditions of 0-17 days can be estimated within one day. Effect of non-standard and variable storage on eye-lenses opacity and the correlation of the latter with freshness and general quality remains to be assessed—*Journal of the Science of Food & Agriculture*, Vol. 5, No. 12, 566-72, Dec. 1954.

Efficient Fermentation

Aeration of fermentations for growth of yeast, production of citric and other organic acids, enzymes, antibiotics, and other microbiological fermentations, requires estimation of oxygen demands of the microorganisms used, and an estimate of efficiency of aeration system in use.

Measurement of K_La values—absorption rate in millimoles of oxygen per l. per hr. per unit of concentration difference—will give a qualitative description of aeration efficiency. It can be measured best with a polarograph, or lacking this instrument, the oxygen uptake of a sodium sulfite solution (0.5% with a Cu or cobaltiquinolate catalyst) according to the method of Cooper, Fernstrom, and Miller will also yield K_La values. With this value for system, and the peak oxygen demand of the organism known, effects of varying aeration and agitation can be estimated.

For best results air rates should not exceed 400 ft. per hr. for closed impellers, or 70 ft. per hr. for open impellers. Baffles in fermenters with agitators are highly important if full

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efficiency of aeration is to be attained.

Only a small percentage of the oxygen supplied is absorbed, about 2% under ordinary operating conditions. A tall fermenter gives better oxygen efficiency than a short one since the gases are more thoroughly scrubbed before escaping—*Bacteriological Reviews*, Vol. 18, No. 4, 254-74, 1954. (113 References.)

Controlling Oxidized Flavor In Stored Frozen Cream

Addition of 0.04% ethyl hydrocaffeate (based on % fat) to cream before freezing effectively delays development of oxidized flavor for more than a year, even in presence of Cu.

Ascorbic acid alone actually accelerates the off-flavor development. However, it acts as a synergist when combined with low concentrations of ethyl hydrocaffeate. With and without 5 ppm. Cu, 40% cream did not develop oxidized flavor during 12-months storage following addition of 0.004% ethyl hydrocaffeate and 25 mg. ascorbic acid per liter—*Journal of Dairy Science*, 197-201, Feb. 1955.

Egg-Washing Machine

Mechanical removal of foreign material from outer surfaces of eggs is accomplished in recently patented apparatus.

Machine comprises a tank containing the cleaning fluid in which two brushes are partly submerged. Brushes are of different diameters and extend the length of the tank. They rotate toward each other, and are so placed that they form a trough to receive and carry eggs. A screw conveyor is installed above the trough in such position that the lower edge of its flights will move eggs longitudinally from the feed end to the discharge. During its travel the egg is thoroughly brushed with cleaning fluid by the rotating brushes. A feed mechanism delivers one egg at a time to the conveyor—U. S. Patent 2,690,576, Oct. 5, 1954.

Making Vanilla Extract

Economics and technology are both involved in the manufacture of vanilla extract, and the choice of method will be determined by a number of factors: Blend of beans available; quality of the desired product, and price at which it must be sold.

The so-called old fashioned process of macerating beans in a barrel with 50% alcohol had its disadvantages, but it produced a superior extract with

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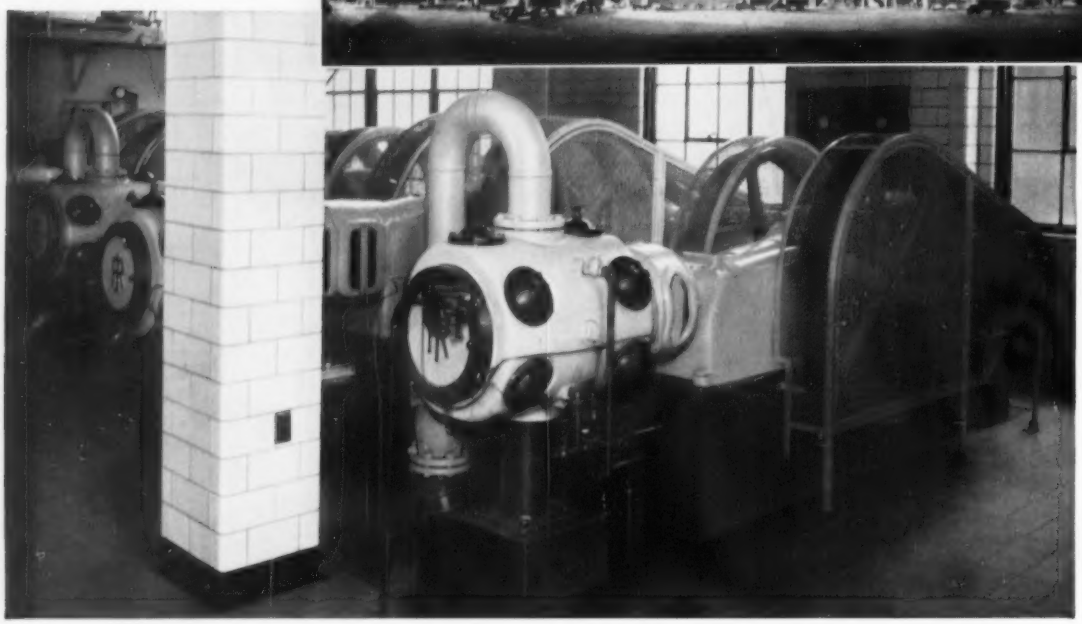

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Wherever oil-free compressed air is needed, it pays to specify Ingersoll-Rand NL cylinders. Write or phone for complete details.

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which most modern vanillas cannot compare in flavor. The process thoroughly extracted the aromatic portion of the bean and removed only enough of the waxes, sugars, resins, gums, and cellulose compounds to give body and a balanced flavor. Finally it was aged 3-6 months to develop the vanilla perfume.

One of the factors responsible for deterioration of flavor in modern extracts was the advent of vanillin. To prevent adulteration the U. S. set up analytical constants for control of vanilla extract. Unfortunately these were a better measure of the non-aromatic than of the aromatic portion of the bean. Manufacturing methods were adapted to meet the constants, and flavor became a secondary consideration. Another factor affecting the flavor of extracts is the rapid methods of manufacture and the failure to age them long enough.

Gnadinger devised a percolation process in which finely chopped beans are treated in a glass-lined tank equipped with a rotary pump. One-third of the menstruum (60% alcohol) is circulated for 24 hr. and removed. This is followed by two more percolations and two water washings. Percolates are combined, brought up to the desired volume, centrifuged and aged. Recovery of the aromatic portion of the bean is 95%.

One of the hazards of the percolation process is that it is possible to extract too much of the bean, particularly of the vegetable-like materials, and thus mask some of the aromatic flavor. Another danger of this and other modern processes is that the extract will not be allowed to age long enough to develop the best flavor and aroma. An extract should be allowed to age 1-6 months.

Obviously these desirable factors place a burden on the manufacturer in the way of equipment, labor, and inventory. The degree to which he observes them will determine the quality of his product—*Food Manufacture*, (London) 65-68, Feb. 1955.

Pectic Enzymes Speed Up Cacao Bean De-Pulping

Cacao beans can be freed from their surrounding pulp by fermentation with a pectic enzyme preparation, according to the specifications of a recent patent.

Although any enzyme is suitable for the process, the inventors prefer pectin esterase and pectinase, particularly the former, and the preferred source is mold fungi.

After removal from the pod, the pulp-covered beans are thoroughly

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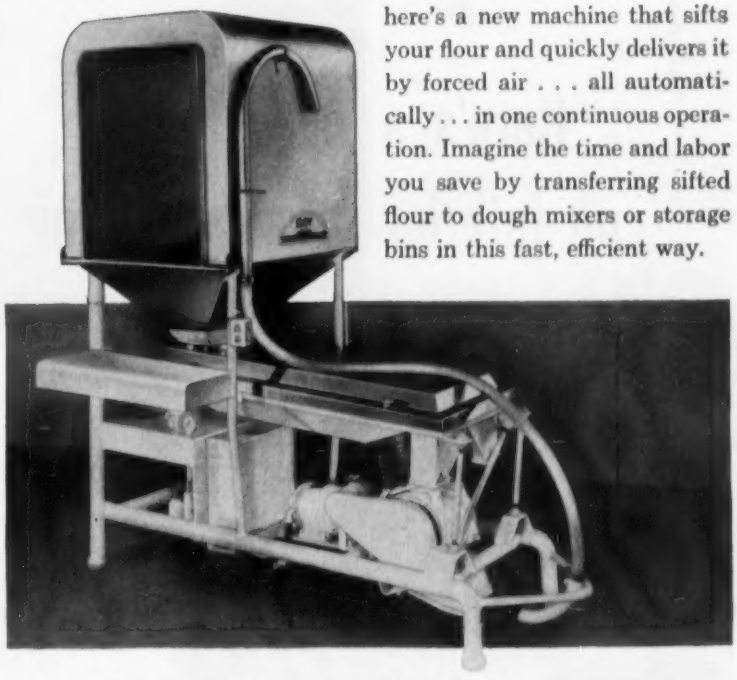

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mixed with the enzyme in a suitable container which is then placed in a room maintained at 86 F. Occasional agitation of the mass will hasten the action, but is not essential. After 24 hr. the pulp will have been decomposed to a point where it can be washed from the beans. Latter are dried and ready for further processing by roasting.

Compared with the customary 4-day process, the improved method saves time. It also yields beans of uniform color and flavor. If applied to freshly harvested beans, the method is said to insure a product of superior quality —U. S. Patent 2,689,181, Sept. 14, 1954.

Iodized Salt Doesn't Harm Food Processed With It

Use of iodized salt in processing fruits and vegetables that contain considerable amounts of salt has no detrimental effect on quality of the product.

This was determined by a series of experiments in which tomato juice, sauerkraut, green beans, yellow sweet corn were prepared and canned with regular salt (controls), and with added KI, KIO_3, and $NaNO_3$, first two in amounts equivalent to that secured by using iodized salt containing 0.012% KI. Bulk sauerkraut and bottled pickled olives were also included.

Following storage 2-3 months at room temperature samples were evaluated for flavor, color, odor, and ascorbic acid content. Effect of iodine seemed to be negligible in all products —*Food Technology*, 103-7, Feb. 1955.

Gasses In Packaged Beer

Control of beer air content during storage and bottling is an important part of brewery quality control. Oxygen is the active part of dissolved air. At 32 F. and a partial pressure of 0.2 atmospheres, solubility of oxygen in beer is about 9 ml./l. (3.2 ml./12-oz. bottle); at 50 F. about 7 ml./l. (2.5 ml./12-oz. bottle); and at 68 F. about 6 ml./l. (2.2 ml./12-oz. bottle.

Air in packaged beer is ordinarily determined by "shaking out" the gases into a strong caustic soda solution which dissolves the CO_2, leaving the "air" (it is usually mostly nitrogen) to be measured in a gas burette.

A simplified apparatus of the Orsat type has been devised for beer gas analysis. It includes a piercing device for bottles or cans, uses only 50 ml. of the gases in the package, and does not contaminate the beer during the removal of the sample.

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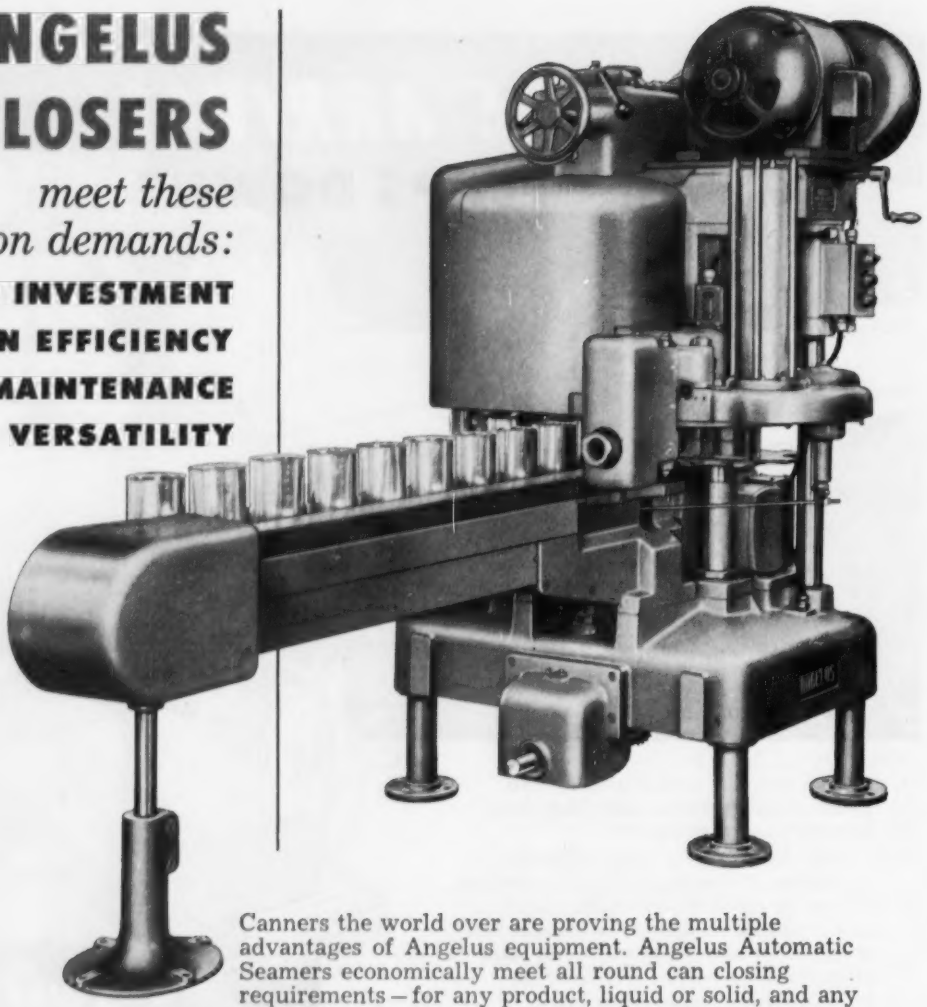

Canners the world over are proving the multiple advantages of Angelus equipment. Angelus Automatic Seamers economically meet all round can closing requirements – for any product, liquid or solid, and any volume up to more than 400 cans per minute.

Model 60 L is just one in the wide range of proven Angelus Can Closing Machines. It is fully automatic and is equipped with six seaming spindles in a rotating turret. The straight line feed, with constant can speed, from conveyor to discharge, assures the maximum in high speed, spill-free performance. Simple machine adjustments vary height capacity and readily installed change parts accommodate for changes from 2⅛" to 4¼" in can diameter. Optional drives provide a production range from 260 to more than 400 cans per minute.

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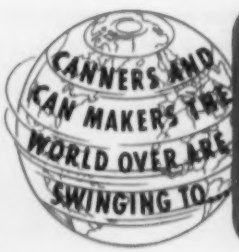

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gen are determined in the gas and from their solubilities in beer and the percentage of each found in the gas sample, their content in the beer package is determined from a calibration curve or table—*Brauwelt*, No. 83, 1237-43, 1954.

Rice Substitutes

Synthetic rice with the appearance of slightly undermilled natural product, the taste (when cooked) of certain Indian varieties, and greater nutritional value than good varieties, has been developed in Mysore, India, and produced in Switzerland, England, and Japan.

Basic materials are tapioca (85 parts) and groundnut (15 parts) flours. Small quantities of karaya gum (1½%), alkali-digested corn cob (1%), stearic acid (0.3%), alkali bisulfite (0.04%) are added, and a coating of calcium caseinate applied to prevent loss during washing.

Incorporation of 20% wheat flour enables elimination of chemical improvers.

In its production, boiling water is added to flour mixture followed by kneading to form dough which is extruded through a rice die. Drying for 2-hr. at 250 F. is followed by spraying with thin suspension of caseinate, steaming and final drying.

Product is considerably cheaper, 3-4 times as much can be produced per acre, and nutritional value is about twice that of natural rice—*Nature*, 199, July 31, 1954.

Rhodesia's Citrus Industry

Essential oils, concentrated juices, and dried cattle meal are being produced from oranges, lemons, and grapefruit at a factory in the Mazoe Valley near Salisbury, Southern Rhodesia.

Yield is 78,500 lb. of essential oils, mainly orange; 93,000 gal. of orange concentrate, 2,500 gal. of lemon, and 2,200 gal. of grapefruit. Analysis of dried meal: Carbohydrates, 63.5 (mostly sugar); fibre, 12.9; fat, 2.0; protein, 5.3; ash, 6.9; and moisture, 9.4.

The factory handles 100 tons of fruit a day. Undersized and damaged fruit is sorted from a picking belt and good fruit delivered to stroage bins from which it is flumed to the processing unit. Essential oils are extracted from the skin of the fruit in high-speed revolving drums which have serrated stainless steel surfaces that pierce the skins and release the oils. The latter, picked up by water sprays, flow to a separating plant.

Interested in cutting costs ...increasing production?

Here, in one catalog are cost-saving facts on efficient, processing operations employing Cyclone metal conveyor belts—showing their advantages over costly manual handling and over belts made of other materials.

Cyclone Conveyor Belt Catalog #5 contains the up-to-date story on the entire line of dependable, Cyclone Belts – which constitutes the widest selection of metal belts in carbon, alloy and stainless steels.

This big catalog includes descriptions, photographs and specifications on *all* the types of Cyclone Belts available. Application pictures show how and where Cyclone Belts are saving time and money in many processing and product handling operations. Send the coupon for your catalog.

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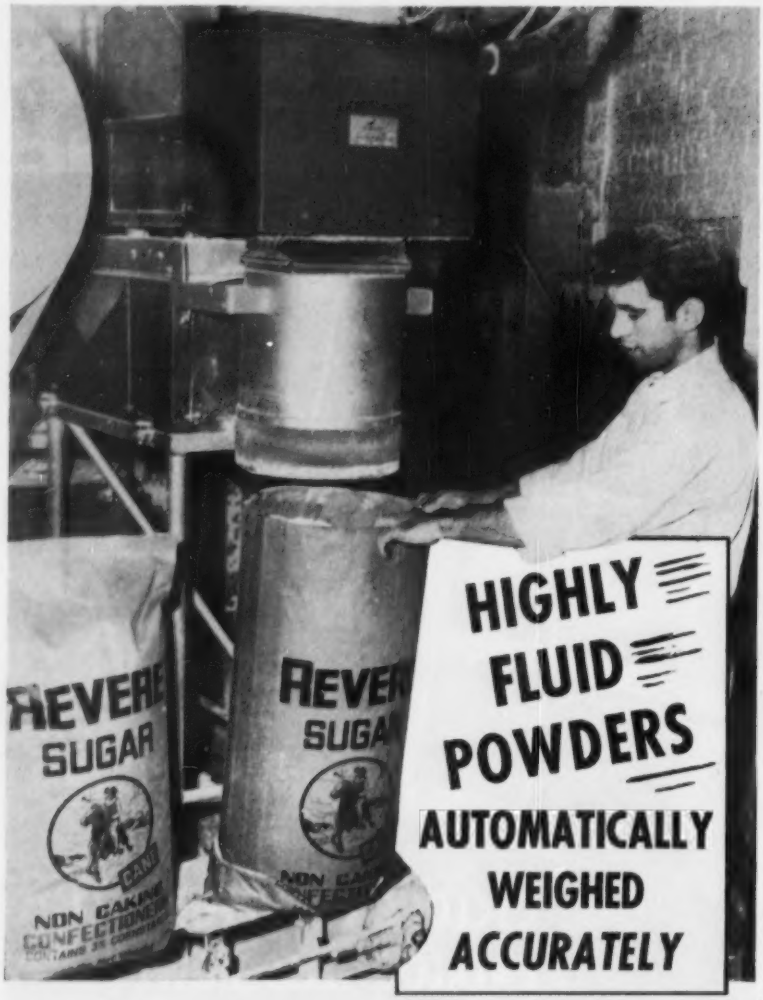

Hard-to-handle powders, such as 6X Confectioners Sugar, are accurately weighed and filled in bags by this new Thayer Scale, Model 700G. It combines a positive material feeder with a sensitive weighing mechanism

to provide exceptional weighing accuracies. On conventional scales, knife-edge-pivots wear down and weights constantly change. This vulnerable part is replaced by the THAYER PLATE leverage system which is guaranteed for 10 years even under dusty, acid or shock-load conditions. An air operated bag holder forms a dust-tight seal while filling. This scale can weigh 100, 50 or 25 lb. bags and controls are furnished to account for changes in flooding or bridging characteristics of powders. Other Thayer Scales are designed for granular or sticky products. Send your weighing problems to our engineers.

THE Thayer SCALE

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BATCHING
FILLING
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THAYER SCALE and ENGINEERING CORP., ROCKLAND, MASS.

Fruit is conveyed to juice extractors consisting of revolving stainless steel drums. Juice goes to a deaerator and pasteurizer prior to concentration in evaporators. Different degrees of concentration are made for the beverage trade and the pharmaceutical industry. Final product is barrelled with a preservative for export—*Food*, (London) 58-60, Feb. 1955.

Bone-Taint Puzzles Packers

Putrid flavors and odors in beef, known as bone-taint, are caused by anaerobic spore-forming bacteria of the genus *Clostridium*.

These bacteria grow rapidly in neutral media; but if the pH falls below 6 their growth rate is greatly reduced, and become almost nil at pH 5. They grow best at temperatures near that in the body of a mammal, slowly below 70 F, and not at all below 50. Concentrations of curing salts above 3% will hinder their growth, and 10% will wholly inhibit growth. In spite of this knowledge, however, incidence of bone-taint remains a puzzling phenomenon.

There is reason to believe that the origin is in the gut of the animal itself. Bacteria may pass through the gut wall in a living animal, or contamination may occur from animal faeces under slaughterhouse conditions. Fatigue, fright, and shock may induce the infection of living animals.

In slaughterhouses, infection may be caused by dirty instruments used to kill the animals. It seems most likely, however, that the organisms are spread by the blood while the animal is still living. If this is true, prevention lies in treatment of living animals. If slaughterhouse infection is responsible, that source must be cleaned up.

Rapid cooling of a slaughtered carcas is essential in preventing the growth of tainting bacteria. Temperature throughout the tissue should be brought below 75-80 F. as soon as possible, and this may not be a simple matter.

In a study of hams it was found that those from farm-killed pigs showed only 5% tainted, whereas in factory-killed pigs the proportion shot up to 50%. Research showed that organisms of intestinal origin were responsible.

Forty-six species were isolated, showing wide variations. Variation was also found in the meat tissues. Some of the muscles had a pH of 5.5-5.9 in farm-killed pigs, compared with 6.9 in factory-killed ones. The pH for factory-killed pigs varied with intensity of fatigue to which the animal had been subjected—*Food*, (London) 52-55, Feb. 1955.

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FIG. 150—Bronze "Union" Vulcanized Composition Disc Globe Valve For 150 Pounds W.S.P.

FIG. 375—Bronze Gate Valve For 200 Pounds W.S.P.

FIG. 2608—Bronze Full Flow Globe Valve For 200 Pounds W.P.

FIG. 560—Bronze Regrindable Horizontal Swing Check Valve For 200 Pounds W.S.P.

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AUTHENTICATED

CASE HISTORY

From the current files of Hoerner Boxes, Inc.

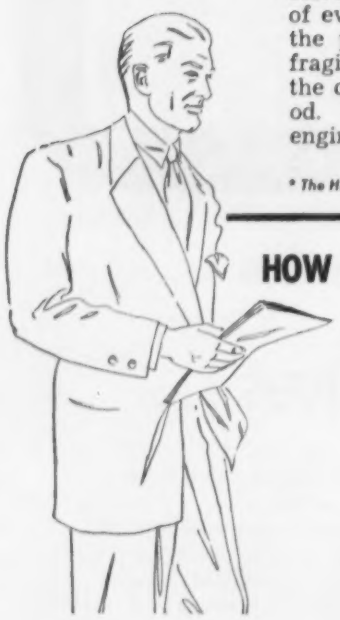
Re: Scott-Rice Company

DAMAGE CLAIMS ELIMINATED

through improved packaging*

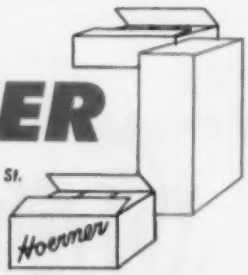
The Scott-Rice Company of Tulsa, Oklahoma, manufactures and distributes steel tubefile cabinets. Until recently, they packaged their cabinets in wood crates, and received damage claims on one out of every two shipped. In addition, the product was large, light and fragile — difficult to package by the cumbersome wood crate method. Then a Hoerner packaging engineer stepped in, studied the Scott-Rice problem and recommended a method of packaging in corrugated containers. In the eight months since Scott-Rice switched to Hoerner, not a single shipping damage claim has been reported! What's more, two men can package the cabinets in Hoerner containers in one fourth the time it formerly took. Major benefit: better satisfied customers through Hoerner packaging.

* *The Hoerner Packaging Engineer responsible: Mr. M. C. Catron*



HOW A HOERNER PACKAGING ENGINEER CAN HELP YOU!

If your company packages things, whatever they are, simply ask us to have a Hoerner Packaging Engineer come in and make an objective study of your packaging operations. It won't cost a cent, or obligate you in any way. It can mean an increased margin of profit through savings in labor and material costs and prevention of shipping losses. Just write to one of the Hoerner plants listed below.



SALES OFFICES: *209 S. LaSalle St., Chicago 4*
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328 Park Avenue, Urbana, Ohio

HOERNER BOXES, INC.

GENERAL OFFICE: *600 Morgan St. Keokuk, Iowa*

PLANTS—*Keokuk, Des Moines, and Ottumwa, Iowa*
Sand Springs, Oklahoma; Minneapolis, Minnesota
Fort Worth, Texas; Sioux Falls, South Dakota
Fort Smith and Little Rock, Arkansas

Packaging Engineers Designers and manufacturers of corrugated boxes.

New Way to Package

—*Continued from page 63*

the packages are set up, flap corners are deliberatly torn when unfolded in the machine. The resulting fibrous corners are compressed by high pressure on the flaps during sealing, thus assuring the excellent bond between cover paper and carton.

Additional protection is provided by the excess paper folded between the flaps during closure.

At this plant, cartons and paper have heat-sealed wax coatings. But plain-surfaced materials are also available for use with glue applicators.

The packager is built both in a single-size design for one package and in adjustable models adaptable to handle various size units.

End (Resume reading on page 64)

Care of Stainless

—*Continued from page 80*

tions containing large amounts of caustic or other salts are used. Ideal conditions for galvanic corrosion are established when deposits left by drying solutions are permitted to form on equipment.

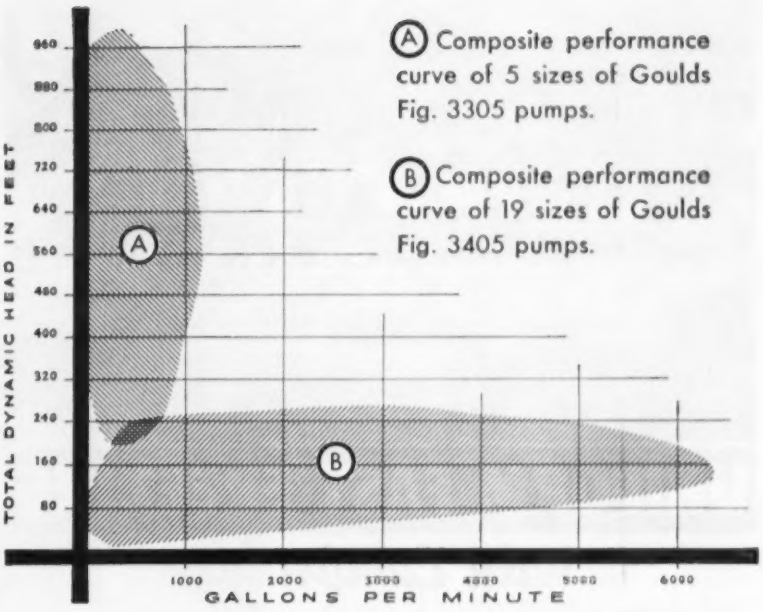
The more simple washing techniques should be tried first, with the more vigorous treatments applied only when necessary. Heat-transfer equipment which is disassembled for cleaning should be allowed to air-dry thoroughly before being reassembled. If possible, it should remain disassembled until returned to service.

Re Germicides

When necessary, disinfectants should be applied to stainless surfaces after final rinsing. And they are to be rinsed, in turn, before the equipment is used again. If chlorine solutions are employed, equipment parts should be completely immersed in, or filled with, liquid for the necessary contact period, then immediately rinsed with clean cold water and allowed to dry. If surfaces are properly cleaned, they will dry without water spots.

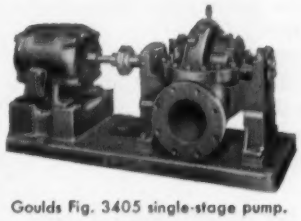
With use of quaternary ammonium compounds, it is common to apply the solution by immersion and draining, wiping, or spraying and allowing equipment to air-dry without rinsing.

Thorough rinsing is essential, however, before equipment is used again. Because these materials are surface active compounds, they require more care in rinsing than other materials which do not adhere so closely

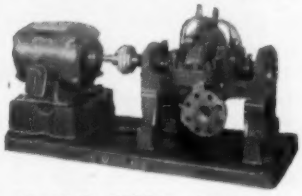


Do you need **pumping capacity?**

. . . or head? . . . or both?



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

MEMBER

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Regardless of what you're freezing, you'll get a more uniform product by washing, blanching, cooling and freezing at controlled speed on continuously moving wire mesh belts. Open mesh permits free circulation of steam for uniform blanching and cold air for faster freezing, provides rapid drainage of wash water and steam condensate. Write for these detailed discussions of how Cambridge Wire Mesh Conveyor Belts can speed production by minimizing manual handling.

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. . . canning, freezing, baking . . . meat, poultry, candy, fruit or produce . . . Cambridge Wire Mesh Conveyor Belts can reduce your operating costs and increase product quality by continuous uniform processing with reduced manual handling. Lifelong rust-protection, quick drainage of process solutions, lack of odor and freedom from contamination are only a few advantages. All-metal belt is impervious to damage from heat and cold. There are no sharp edges because Cambridge belts are woven from round wire.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, and from any metal or alloy. Special raised edges or cross-mounted flights are available to hold your product during movement.

Call in your Cambridge Field Engineer to discuss how you can cut food processing costs by continuous operation. You can rely on his advice. Write direct or look under "BELTING, Mechanical" in your classified telephone book.

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to metallic surfaces. Where control of bacterial contamination is important, and cleaned equipment will be out of service for 12 hr. or more, this type of treatment is preferred.

In some cases, silicone compounds are applied to provide an easily cleaned surface. This material may simply be wiped on with a clean rag, no curing being necessary. A very thin film yields a surface that permits removal of ordinarily stubborn soil by wiping.

Should operation of sanitary valves, becomes "stubborn," there is available a silicone lubricant that reduces frictional wear, yet does not contaminate the product.

End (Resume reading on page 80)

Future for Frozen Food

—Continued from page 88

Trouble is that some sauces curdle and separate. Success has been achieved by adding some waxy maize starch to the regular starch used for, say, poultry sauces. Development of dryness and toughness of some portions of pre-cooked items is still another problem.

C. H. Brokaw, Minute Maid Corp., reviewed the need for research on citrus fruits as an avenue toward improving processed frozen juices. Needed, for example, is an earlier ripening orange variety with a better color. Also sought are varieties with a higher solids content and one that could take up the slack between those picked after midseason and before valencias are ready for harvest.

As for grapefruit, wanted is an earlier maturing fruit with a lower acid content. Little is known about the "castor oil" flavor that develops in grapefruit.

Basic studies are needed on enzymes and clouding. Pursued are such speedier and better methods for evaluating quality as pulp, true solids, and color.

Too little is known about hesperidine plating-out on evaporators, effect of yield on flavor of concentrated juices, and best degree of concentration—3 plus 1, or higher.

Mr. Brokaw sees a possible future for frozen grapefruit sections.

W. J. Harte, Jr., John H. Dulany & Son, emphasized the need of a good blancher for leafy vegetables as well as an automatic filling machine for leafy vegetables and French-style string beans.

Because of their space-saving feature, dehydrofrozen foods are of significance to the Armed Forces, according to Mr. Harte. But the housewife isn't ready for them.

End (Resume reading on page 89)

GREATER VERSATILITY IN TUNA PACKING WITH

STERLING SPEED-TROL!

Speed-Trols add versatility to the Pak-Formers we manufacture for the tuna industry because they permit operators to quickly and accurately regulate Pak-Former speeds to conform to varying cannery processes, thereby permitting maximum production under any set of circumstances. Minimum mounting space, versatile mounting features and extremely long belt life are other important Speed-Trol advantages, reports Mr. Richard Schroeder, Secy.-Treas., E. H. Carruthers Co., equipment engineers and manufacturers in Warrenton, Oregon.

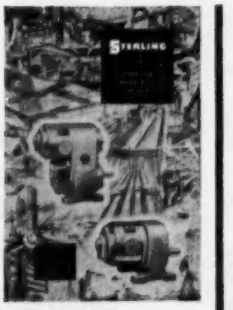
STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit.



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All these **Eastman antioxidants** to help you protect food products against oxidative deterioration . . .

ANTIOXIDANT	PERCENTAGE COMPOSITION (BY WEIGHT)						
	Butylated Hydroxy-anisole	Butylated Hydroxy-toluene	Propyl Gallate	Citric Acid	Mixed Glycerides	Vegetable Oil	Propylene Glycol
TENOX BHA **Applications:** Vitamin A, chewing gum base, food packaging materials, paraffin wax, polyethylene.	100						
TENOX BHT **Applications:** Paraffin wax, polyethylene, food packaging materials, vitamin A, citrus and essential oils.		100					
TENOX PG **Applications:** A compound, water-soluble in effective amounts, which produces high AOM stabilities.			100				
TENOX II **Applications:** Lard, animal fats, vegetable oils, potato chips, spices, cosmetics, nuts.	20		6	4			70
TENOX IV **Application:** Lard for pastry, crackers, vegetable oils and candy where good carry-through stability is desired.	20	20				60	
TENOX VI **Application:** Designed to provide maximum stability to lard under Meat Inspection Regulations. Also useful in stabilizing vegetable oils, potato chips, cereals and nuts.	10	10	6	6	56		12
TENOX VII **Application:** A high concentration of anti-oxidants dissolved in an extra soluble solvent combination for easy addition where suitable agitation equipment is not available.	28		12	6	20		34
TENOX R **Application:** Tallows and greases for animal feeds.	20			20			60
TENOX S-1 **Application:** Provides high AOM stability. Vegetable oils, potato chips.			20	10			70

Don't let rancidity, bad odor and off-flavor cause returns, losses and dissatisfied customers. Use Tenox antioxidants to protect sensitive foods against oxidative deterioration.

Antioxidants are simple to use . . . inexpensive to use. As their name indicates, they retard the natural oxidative breakdown of fats and oils which in turn causes rancidity. Their value has been proved on a wide range of food products. Every year finds antioxidants playing a bigger role in food protection.

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Questions & Answers

THIS MONTH'S PROBLEM

A Floor Query

Question—We are currently making plans for a new bakery and would appreciate some help. Of particular interest to us is finishing off walls and floor so that they will be easy to clean. This suggests ceramic tile walls and floor that could be hosed down at the end of each day. However, we are wondering how this floor would withstand heavy equipment and racks with steel wheels, and how hard it would be on workers' feet as compared to a maple floor. Maple is usually used for bakery floors but it does not hold up too well under repeated water scrubbing. Can tile walls also be used in walk-in refrigerators? We want these walk-ins designed to encourage constant cleaning. Some workers also object to concrete floors. Also, do you know of any material that will do the job of tile at a lesser cost?

FEBRUARY PROBLEM

Can't Get Proper Fills

The question was—Before purchasing a second-hand filling machine, we made some test runs and found the equipment satisfactory. For these trials we made a small batch of prepared cake mix in a horizontal ribbon-type mixer. Each batch was then packed in drums, transported to our machine shop, and there test filled. But when we installed the machine on our production line, we were unable to get the fills obtained in testing. On the line, cake mix is fed directly from mixer, through sifter, and into hopper of filler. Can you offer any solution to the trouble.

Answer—It appears to us that you packed into drums a thoroughly sifted and aerated mix which, after packing and shipping in drums, became deaerated and compact. As a result, when test runs were carried out in your machine shop no difficulties were encountered in filling the required amount of cake mix into containers.

But when the filler was installed on your production line, trouble could be expected in handling the mix because of its fluffy condition. This would be especially true if your plant is operating continuously. For in this case, aerated cake mix is sifted directly into the filler hopper.

More on Batter Consistency

The problem should be analyzed with respect to rheological properties and equipment capable of measuring and controlling the batter consistency.

Principal batter ingredients used for breading shrimp are flour and water. When they are mixed together, gluten and starch are dispersed in the water and ultimately hydrated. Resulting batter may be classed as a non-Newtonian, pseudo-plastic mixture. Viscosity of a pseudo-plastic material decreases with mixing rate, thus if the batter is vigorously mixed, its viscosity decreases. Batter consistency may also be reduced by adding a small amount of water or raising its temperature.

Thus, to maintain a constant, uniform viscosity, these factors must be considered.

Since ice water from shrimp lowers the viscosity of the batter, obviously a heavier batter must be introduced into the breading-tank mixture to raise the viscosity to the desired level. And this can be achieved by automatically controlling batter viscosity. To do this, a viscometer—an "on-off" recorder-controller—and valve are required.

This instrument will automatically feed the more viscous batter from mixing to breading tanks when the controller opens the valve. When the desired viscosity is reached, the valve closes.

Of course, batter in the breading tank must be continuously mixed. One effective method is to circulate the batter through a centrifugal pump. This setup not only uniformly mixes the batter, but also equalizes temperature of the breading batter and lowers its viscosity. — *William D. Powrie, Food Technologist, Amherst, Mass.*

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

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says HIGH SEAS Tuna Packing Co., Inc. of California

"We have used LUBRIPLATE Lubricants for over 15 years and find they do everything. They keep fish processing machinery from seizing and keep it easy to take apart and reassemble. This is very important in food processing plants. Because LUBRIPLATE Lubricants are so effective, economical and long-lasting, they save us time and money."

Earl Lockhart
Master Mechanic

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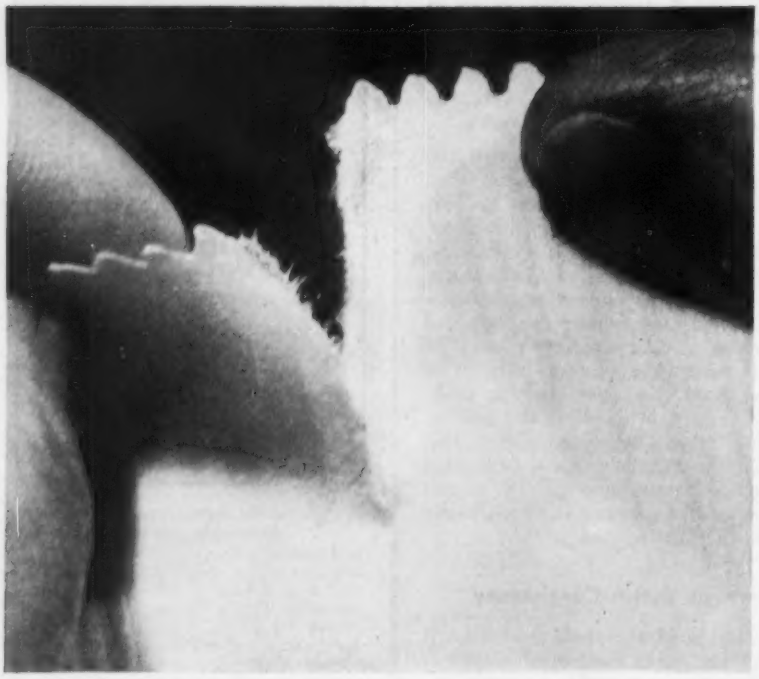

T-P EXTRA LONG FIBERS MEAN BETTER PAPER SACKS

volume bag users find Thomas Phillips TUFFPAK sacks tougher, better built at no extra cost . . .

Having breakage trouble in your shipping sacks? Why continue with standard quality when T-P TUFFPAK is available at no extra cost? TUFFPAK is made by a special Thomas Phillips process that gives each square inch of paper more and longer fibers.

These extra strength papers are carefully made into paper shipping sacks that mean less loss during filling, shipping and warehousing.

If your breakage is running above normal, why not let a Thomas Phillips representative demonstrate TUFFPAK in your plant? There's no obligation.

TUFFPAK is made into bags from 2 to 100 lb. capacities, Sewn or Pasted Open Mouth, Sewn or Pasted Valve, one to five walls.

BAG USERS: SEND FOR LATEST BROCHURE

THE THOMAS PHILLIPS COMPANY
AKRON, OHIO

Stabilizing Additives

Question—In your November article "Coming Up: Better Hard Butter Coatings," you mention the use of Spans and Tweens in these products. I'm under the impression that they are not permitted in foods. Will you straighten me out?

Answer—Spans and Tweens are not permitted in foods in which federal standards have been set up, since they were not considered as optional ingredients when most of these standards were being made. Recently, FDA excluded them from bread standards, feeling there would be a certain amount of deception in using them to make bread seem softer and fresher than ordinary bread.

Spans and Tweens are used in various types of foods, having been thoroughly tested by Atlas Powder Co. And, as you know, they are presently being employed in the specifications for army-ration coatings in amounts of ½% Span 60 and ½% Tween 60.

Early last year, a leading chocolate manufacturer released a bulletin stating that while it is not using these additives in any of its standardized coatings, it is employing them in imitation sweet cocoa and vegetable fat (other than cacao fat) coatings.

The statement reads: "Because of the impact of present cocoa bean prices on the confectionery industry, we have developed a new line of high grade confectioners' coatings. For proper emulsification, we utilize lecithin, an emulsifier included in standards of identity for cacoa products, and Span 60 and Tween 60, the same emulsifiers as are currently used widely by ice cream manufacturers and commercial bakers. These coatings are not covered by standards of identity and hence are labeled as *'Imitation Sweet Cocoa and Vegetable Fat (Other Than Cacoa Fat) Coatings'.*"

If you plan to use any of these materials in foods, we suggest that you check with Atlas Powder Co. (Wilmington, Del.), maker of the above-mentioned emulsifiers.—*Justin J. Alikonis, Director of Research, Paul F. Beich Co., Bloomington, Ill.*

Q.—We are planning to sell Thousand Island dressing. It there anything we can add to the formula, such as Mycoban, to prevent spoilage?

A.—We can't see how Thousand Island dressing could spoil, provided you use sufficient vinegar in your formula. Acidity of your final product should test 1.25-1.50% (expressed as acetic acid).

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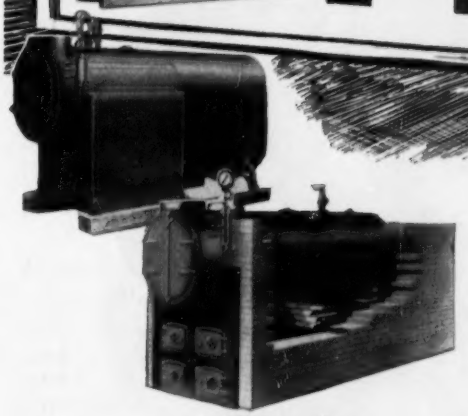
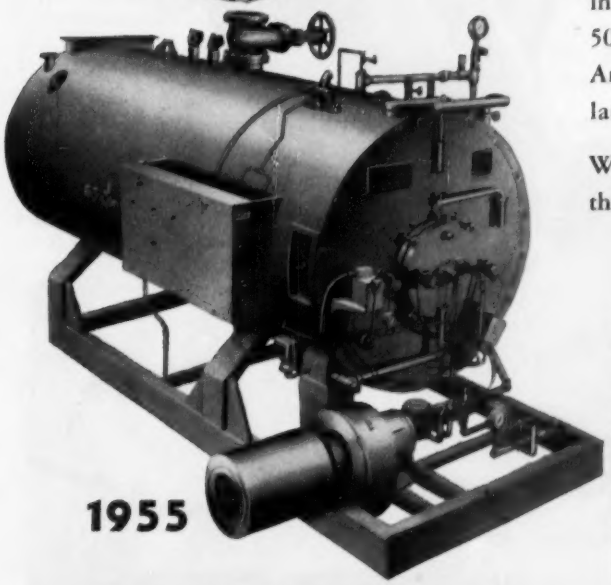
107 YEARS of RELIABILITY ARE BEHIND EVERY AMESTEAM GENERATOR

1848





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20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas, or oil-gas combinations with quick fuel switchover feature.

In your selection of a boiler, it's important to remember — experience *does* count. And what better assurance of top boiler quality do you have than the Ames record: 107 years of building fine boilers — boilers which have given economical, satisfactory service throughout the industry! Many Ames units purchased 40 to 50 years ago are still faithfully on the job. Amesteam Generators always incorporate the latest advances in package boiler design.

Write today for details on these boilers with the proven record of reliability.

AMES IRON WORKS, INC.
Box B-45, Oswego, N. Y.

Show me how I can benefit from Ames experience and nation-wide organization in getting a top boiler value.

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For more information, use coupon on last page.

The Taste of Success

If this look of joyous expectancy turns, with the first bite, to one of blissful satisfaction...there can be no doubt the confection has achieved "The Taste of Success"! Ice cream, in any form, is an undisputed national favorite... but whether or not a specific item shares this popularity, AND sales volume, depends primarily on one factor . . . its flavor, and of all ice cream flavors VANILLA is still first choice. D&O VANILLA CONCENTRATES are unsurpassed for purity and uniform quality, and the factors of concentration, solubility and labeling requirements have all been carefully considered. Particularly applicable to ice creams and other products containing appreciable amounts of natural oils or fats is the exclusive D&O line of VANIPROX Concentrated Vanilla Sugars. Trial quantities and specific recommendations will be made if desired... and individual testing carried out in the D&O Flavor Laboratories. Give your confectionery "The Taste of Success" with D&O VANILLA PRODUCTS!

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Needs Peroxide Test

Question—How can I detect hydrogen peroxide in H_2O_2-treated milk? What is the catalase enzyme that is used to remove the peroxide? Do you know of any test for detecting the catalase?

Answer—There are several tests for determining the presence of hydrogen peroxide in milk. Simplest, we believe, is the Arnold & Mentzel vanadic acid test.

To carry it out, add 10 drops of vanadic acid solution (1g. of vanadic acid in 100g. of dilute H_2SO_4) to 10 ml. of milk. Presence of hydrogen peroxide is indicated by the appearance of a red color. This test is not affected by heating the milk.

Catalase is an oxidizing enzyme that breaks down the peroxide. It is used, therefore, in several patented processes to remove excess hydrogen peroxide added to milk to insure almost complete destruction of all microorganisms.

We know of no test for catalase. Since it is very heat-sensitive, temperatures employed to pasteurize milk will inactivate any catalase not used to oxidize the peroxide.

Metal Contamination

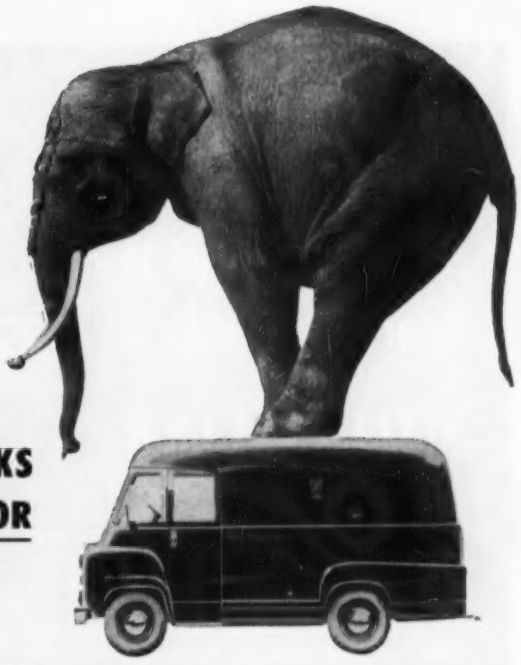
Question—We grind one of our products through a very fine, nonmagnetic type hammer mill. Occasionally, we have experienced metal contamination when a screen ruptured without our knowledge. Can you suggest how we can protect our product from this contamination?

Answer—First, we must assume that your product or process does not, for some reason, permit a final sieving or filtering after milling that would be fine enough to insure removal of all metal fragments likely to be present through an accident in your mill screen. Some of these particles might be much finer than the desired particle size of the finished product.

Initially, then, we would suggest that you consult the screen supplier. Possibly there is some defect in the material, or in the method of perforating, that can be remedied, with the chance of eliminating such failures.

Next, a rigid inspection system should be set up and rigorously followed, so that the very first signs of screen failure, such as fine cracks, bulges, etc., can be detected. Such signs would call for retirement of the screen from service, so you should plan to keep sufficient replacements on hand.

If perforations are very small, it's probable that the screen metal will



LUNN PLASTIC TRUCKS HAVE SUPERIOR STRENGTH

New lightweight all fiber glass plastic cab and truck body

These facts convinced United Parcel Service, serving thousands of stores, to invest in reinforced plastics for their delivery trucks:

Strong and Durable

Strength-to-weight ratios better than steel. Will not dent, has outstanding impact resistance.

Lightweight

40% lighter than metal trucks. Longer tire life, less gasoline consumption, greater payloads.

Less Maintenance Costs

Corrosion and rot proof. Resists most acids and solvents. Needs no painting. Repair made easily and inexpensively, no elaborate equipment is required.

Better Design

Reinforced plastics offer better design possibilities for modern styling. Smoother, sleeker lines easily molded with this amazingly durable material. Permanent gloss and lifetime colors are impregnated into the plastic.

Better Roadability and Safety

Lower center of gravity eliminates top heaviness. Truck *holds* road better. Vibration-free, no metal joints. Easier to maneuver. Less driver fatigue.

Plaskon Polyester Resins for UPS trucks supplied by Barrett Div., Allied Chemical & Dye Corp., N. Y.

About Lunn

Lunn's plastic cabs and trucks are revolutionizing the automotive industry. A leader in reinforced plastics, Lunn has pioneered many "firsts": body parts for Chevrolet's Corvette, and the Kaiser Darrin, bathtubs, airplane structural parts, aircraft fuselages, trays, tote boxes and many other new industrial products.

LUNN INDUSTRIES

General Offices: Huntington Station, N.Y.

Plants: Huntington Station, N. Y.; Ashtabula, Ohio; Detroit, Mich.

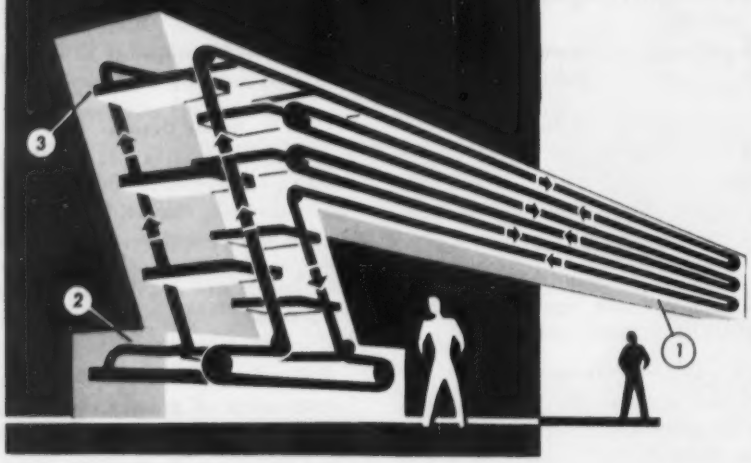
For more information, use coupon on last page.

Now COOL, HEAT or DRY your products in a fraction of the floor space with a GREER MULTI-TIER

. . . because a MULTI-TIER provides 100 to 1000 feet of cooling, heating, or similar processing travel in floor space as small as 15 feet.

Gives you 10 minutes to 10 hours of overhead processing travel with exact time, temperature, and atmospheric control.

In one application alone, Multi-Tiers replaced three men, boosted production, in one-third the floor space.



1. Saves floor space — ample headroom.
2. Conveys products through controlled processing cycles without jar or jolt. Automatic or manual loading and unloading. Easily enclosed to meet wide range of cooling or heating requirements.
3. Trays always perfectly level. Custom fitted to your products.

WRITE 8-page bulletin tells how a Multi-Tier can save you time, labor, and floor space. Send for your copy.

J. W. GREER COMPANY

Wilmington, Massachusetts

GREER

Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.

have to be correspondingly thin (since it is difficult to pierce heavy metal with very small holes). Such thin sheets may have a tendency to flex during milling, and this, in turn, may cause ultimate failure through metal fatigue. Sharp inspection will greatly aid in discovering the first tiny screen cracks before rupture occurs.

A further safeguard would be to install an electronic metal detector between the mill and point of final use. Assuming that the milled product is pumped, conveyed, or flows by gravity as it leaves the mill itself, it should be possible to put in a short section of glass, plastic, or other non-metallic pipe or chute in the line of flow.

A metal detector can then be set up with this pipe or chute passing through the coil aperture, with care taken to select the minimum size detector that will accommodate the pipe or chute so as to obtain maximum sensitivity.

If a screen should then fail in service, the metal detector would almost instantly detect metal fragments passing through with the product, and would either actuate a warning signal, divert the product, or stop the process entirely.

Re Fortifying Peanut Butter

"The discussion on fortifying peanut butter with vitamin A (p. 186 Dec. FE) was very interesting and was a well presented description of the reason and method for fortifying.

"There is equally good reason for fortifying the peanut butter with vitamin B_1. Peanut butter is in fact one of the few foods which are suitable carriers for both the fat and water-soluble vitamins. The rational for the fortification of vitamin B_1 is that while peanuts have a very high B_1 content, about 80-90% of this natural content is destroyed in roasting and processing the nuts into peanut butter. Fortification restores the vitamin content of butter to that of the unprocessed peanuts.

"On the basis of extensive laboratory data, addition of ½ mg. of vitamin B_1 per ounce of peanut butter is suggested as the proper fortification level. Here, 1-oz. of peanut butter provides ¼ of the daily requirement for B_1.

"The addition may be by means of a salt-vitamin B_1 premix fed into the peanut mill, or batch methods of mixing may be employed. Other means are used, depending upon the specific processing setup.

"Extensive tests have shown that vitamin B_1 is very stable in peanut butter."—*G. K. Parman, Technical Department, Vitamin Division, Hoffman-La Roche, Inc.*

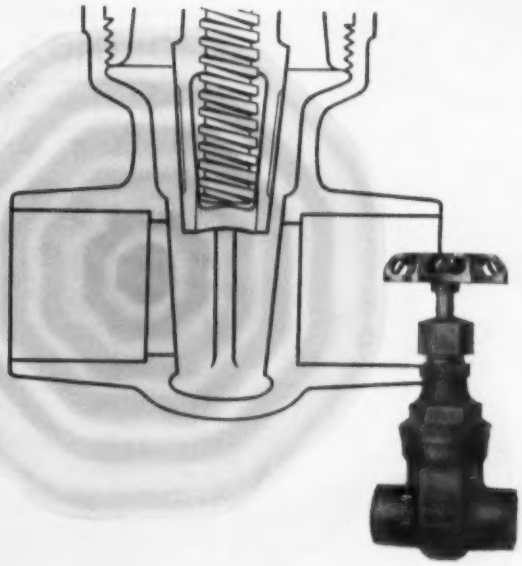
When the heat's on

you need the extra strength of

JENKINS

Solder and Socket End

VALVES



Solder End GLOBES and ANGLES

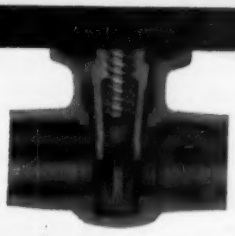
300 lbs. O.W.G.
¼" to 3"

Fitted with Renewable Composition Disc.

Solder End GATES

225 lb. and 300 lb. O.W.G.
⅜" to 3"

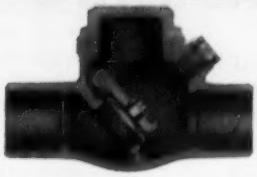
With solid or split wedges, and stationary or traveling spindles.

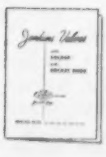


Solder End CHECKS

300 lbs. O.W.G.
¼" to 3"

Regrinding. May be easily reground without removal from line.





NEW BULLETIN Lists all Jenkins Solder End and Socket End Valves and gives complete instructions for soldering and brazing. Ask for Solder-Socket End booklet.

The "light-duty" look of copper tubing installations is deceiving. Valves must provide an accurate fit to tubing and *hold it* under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, valves must withstand unusual strains in operation.

Jenkins Solder End Valves are engineered to meet these demands with strength to spare. High tensile bronze castings have liberal dimensions for extra rigidity. Smooth, clean bores assure accurate fit, easy soldering, positive seal to types K, L, and M Copper Tubing.

For faster, trouble-free installation, and lasting economy, specify Jenkins Solder End Valves. Jenkins Bros., 100 Park Ave., New York 17.

JENKINS Socket End Valves

for Class B or IPS Tubing

Jenkins bronze valves with socket ends for silver-brazing are made in Globe, Gate, and Swing Check patterns to control compressed air, hot oil, and similar fluids in tubing hookups where specifications call for permanent, leakproof joints. Complete information in the Bulletin offered below.

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VALVES
SINCE 1864 TRADE JENKINS MARK
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Rent or Buy Units?

Question—Recently, we've been offered some needed production equipment on either an outright purchase or rental basis. Considering the ratio of rental to purchase price, it looks as if buying might save us quite a lot of money. We are wondering why rental is being offered, and whether we may be overlooking some important factors which might favor renting.

Answer—It is true that a first look at rental vs. selling price usually leads one to favor immediate purchase. However, you are wise to take a little more time to analyze the situation from other points of view.

First, consider that if you buy this equipment, you must set up its cost as a capital asset and then charge off depreciation yearly, according to one of the accepted formulas. Then, you must figure interest on the money tied up in this asset, as well as the cost of insurance to protect your investment. In some localities a personal property tax may be levied, and this becomes still another cost of owning.

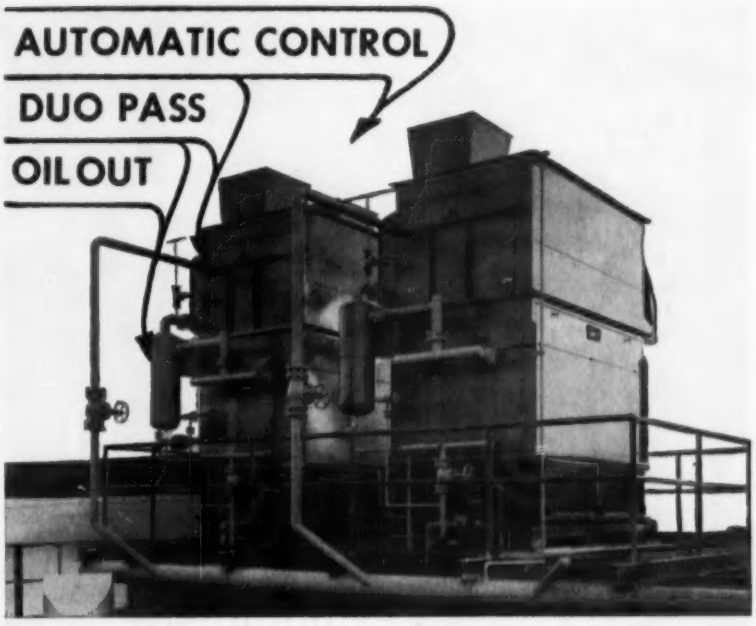
When all these capital or carrying charges are totalled, they may come quite close to the rental charges, and you may be surprised to see how the difference between cost of owning and of renting has dwindled. Now, this difference is the only real saving to be realized through purchase. So it would be well, at this point, to figure what this saving actually amounts to as a return on the investment, ie., the purchase price. If this return is not sufficient to pay off the investment within the usual pay-off period in your company, you can usually conclude that you are better off to rent and use your capital in some more profitable manner.

Of course, there are some cases where a particularly advantageous rental scheme may be offered—as, for example, one which includes the cost of maintenance parts and labor. In such cases, your comparison would

---

Q.—Can you instruct us on how to make a non-alcoholic, true vanilla flavor using glycerine?

A.—Here are two formulas: (1) Add 5 lb. of chopped vanilla beans to 5 gal. of 50% glycerine. Strain batch, after two weeks, through muslin and makeup, with enough glycerine, to 7½ gal. And (2) heat 1 gal. of glycerine to 230 F. Dissolve in glycerine ½ lb. of oleoresin of vanilla, gradually add 1 gal. of hot water (with constant agitation), and strain after several hours through cheese cloth.



SAVE HALF THE ENGINEER'S TROUBLES ...WITH A REFRIGERATION PLANT

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

"The Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 103; Address Dept. F.I.

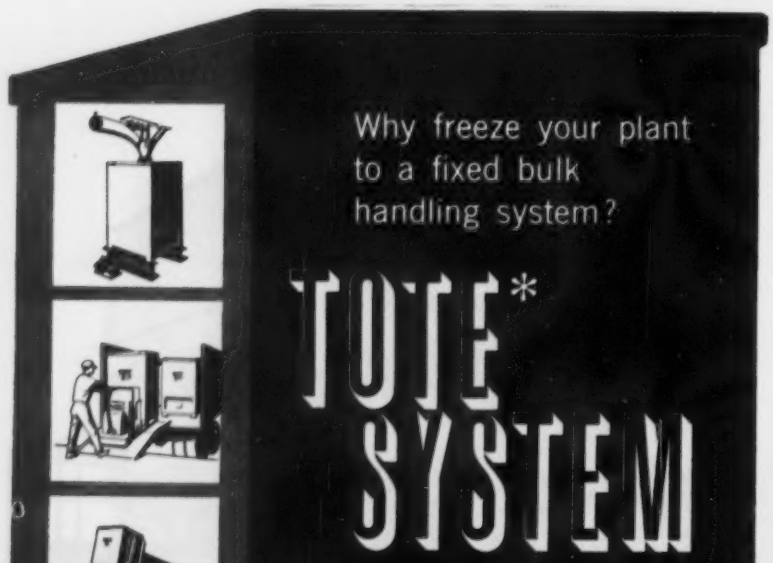
You can see one of these installations near you.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N.Y.

District Engineers in Principal Cities of United States and Canada

For more information, use coupon on last page.


Why freeze your plant to a fixed bulk handling system?
TOTE* SYSTEM
is Economical
Flexible
Expandable
See our exhibit at 1955 Baking Industry Exposition Atlantic City October 1-6

consider these facts:

1. Tote System is a *complete* bulk material handling system built around easily handled and transported aluminum bins plus automatic filling and discharging equipment.
2. Tote System is completely flexible —can be readily adapted to present and future plant layout.
3. Tote System is now being used by hundreds of manufacturers and processors to handle thousands of tons of bulk materials every week.
4. Among the many applications of Tote System are these:
   - For inter-plant shipment of bulk materials.
   - For in-plant storage and handling, including temporary storage of surge capacity between production and packaging.
   - For accurate and automatic weighing and blending.
5. Tote System saves time and labor ...container costs...storage costs ... losses due to weather and deterioration ... losses due to spillage, sifting and dusting ... losses due to rodents and insects ... original product quality.

Some of the materials now being handled are cement • sugar • flour salt • plastics • soy meal • ethocel powders • whiting • feed • carbon black • phosphates • detergents silicones • soluble coffee • soluble tea • phosphor powders • dacron sherbet powders • soft drink mixes cake mixes • titanium sponge

Tote Engineers will survey your plant to determine the savings you can effect—at no cost or obligation.

Meanwhile, write for illustrated literature.

*Tote and Tote System Reg. U. S. Pat. Off.

TOTE SYSTEM, inc.

690 SOUTH 7TH BEATRICE, NEBRASKA

have to include your own maintenance expenses in cost of owning, while it would already be a part of the rental. These cases would be even more likely to favor rental on final balance.

There is another factor which may be overlooked when studying the problem from a purely dollars-and-cents angle—that is, obsolescence. If you buy this equipment, and a much better model come on the market a year, or even five years, from now, you may not be in a good position to discard your machine and replace it at once. If, on the other hand, you have a rental agreement, it can be terminated in a fairly short time and replaced with a new one covering the more efficient equipment. This will help you to maintain flexibility and a good competitive position.

Lye-Peeling Beets

Question—Can you furnish us with information on percent caustic solution for lye-peeling of beets? We'd also like to know the optimum temperature of the solution as well as proper time of contact of lye solution with beets.

Answer—Depending upon grade of beets and type of scalder, from 5-10% alkali (lye) is needed.

High temperature does not injure beets. And since peeling as quickly as possible is desired, the lye solution is usually held at 215-220 deg. F. But if you find that you must go to higher temperatures, it may be necessary to add some salt to raise the boiling point of the alkali solution.

As for proper timing of contact of lye solution with beets being peeled, you may have to do a little experimenting. Reason is that too short a treatment time will result in difficulty in washing off the peel, and extra trimming may be necessary. If, on the other hand, treatment is too long, the beets may become soft and excess sloughing-off may occur.

You will find that optimum time for disintegrating the peel of beets will depend upon the temperature and concentration of the lye solution. We can only suggest that you try working in the 2 to 6-min. range to determine best immersion time with minimum peeling loss.

Q.—Can you furnish me with instructions on making an approximate 100-lb. batch of pineapple-pie filling?

A.—Bring to a boil: Crushed pineapple, 49.5 lb.; sugar, 21 lb.; salt, ¾ lb.; and water, 19 lb. Dissolve 3 lb. of cornstarch in 8.5 lb. of water. Add to boiling fruit batch, cook until clear.

TRY THIS TASTE TEST!

Spending too much on cocoa butter? Try Monsanto Ethavan and Vanillin... snap up flavor... cut costs in compound coatings

These chocolate coating samples look alike, but each was made with a different formulation. The first has hard butter coating with Monsanto Ethavan; the second has hard butter coating with Monsanto Vanillin; the third has a cocoa butter coating with Monsanto Vanillin.

MAKE YOUR OWN TASTE TEST!

Send for this test kit today. Prove to yourself that compound coatings, pepped up with Monsanto Vanillin and Ethavan, can taste as good as costly cocoa butter coatings.

Supplied in pure, fine crystal form, Monsanto Ethavan and Vanillin can be added to your compound without diluting or lowering its viscosity. Temperature extremes required for hot or cold processing cannot affect the flavor potency of these two fine products.

After you take the taste test, you'll want to add Monsanto's Ethavan or Vanillin to your next formulation or specify them to your flavor supplier. There's always an adequate supply at a stable price because Monsanto makes *all* the raw materials required for their manufacture—your assurance of uniform, dependable quality.

Ethavan: Reg. U. S. Pat. Off.

MONSANTO

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Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Box 478-N-2, St. Louis 1, Missouri

Please send me the Monsanto chocolate coatings test kit.

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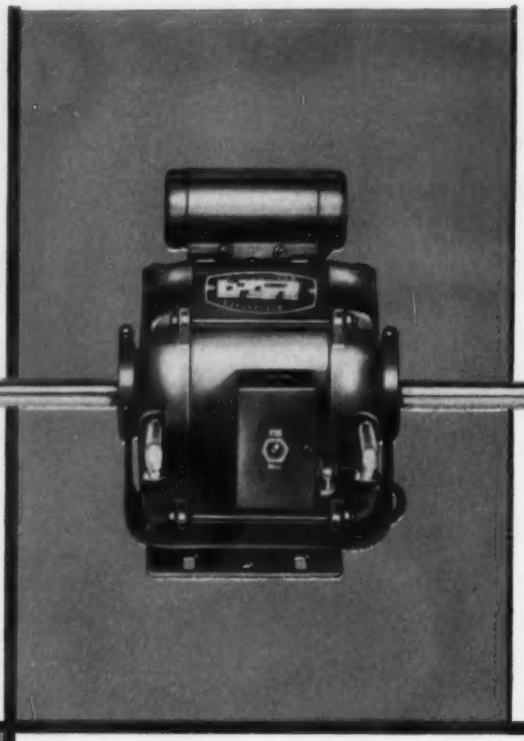
Specify more than "satisfaction"



specify

LELAND

No product is any better than its components . . . no motor any better than what went into it — in design, materials, in craftsmanship.

And Leland's policy has always been to *go beyond* minimum requirements . . . to give you the *extra* value that *assures* dependability, that *surpasses* mere customer "satisfaction"

It has meant painstaking, creative design. Often the use of finer materials. Always more rigorous quality control. But that policy has proved successful because users *know and appreciate* the extra value a Leland motor offers.

Look for more than "satisfaction" from the motors *you* specify, buy or use. It costs you no more . . . it does mean a finer, more reliable product.

Another AMF Product

LELAND MOTORS

For more information on the extensive line of Leland Motors, from 1/6 to 5 hp., write THE LELAND ELECTRIC COMPANY, Division of American Machine & Foundry Company, Dayton 1, Ohio.

Unique Salt Tester

—*Continued from page 86*

essential to limit polarization (evolution of hydrogen and oxygen at the electrodes), which occurs when batteries are used.

Effect of polarization is a non-linear relation between current flow and salt concentration that makes accurate and reproducible readings possible only when the sample is stirred vigorously. And that's not practical in plant operations.

Meter's electrodes are of platinum. They are placed ¾ in. apart in this instrument, but the distance may be varied. In fact, conductivity data are applicable only to the particular set of electrodes used because electrical conductance depends upon the nature of the electrodes, the distance between them, and their area.

The ammeter has a full range of 0 to 1 milliamp., being shunted by fixed resistors that enable flexible operation. Thus, the electrical circuit contains two resistances—a fixed ammeter resistance and a variable resistance across the electrodes.

Result is a slight deviation from the ideal linear relationship between current and salt content. But this error is negligible—is not enough to alter accuracy.

End (*Resume reading on page 87*)

Speed on Small-Can Line

—*Continued from page 62*

a slightly larger tolerance for larger-size containers

The filling action is positive. Motion of the piston assures injection of a precise quantity of product in the container, since filling is independent of gravity. Amount of fill is measured by the exactly controlled stroke of the pistons within accurate machined cylinders (not by the container, which may vary in capacity).

Slope of the cam track is straight. This produces a constant flow of product into the container, avoiding surging and splashing.

Space between upper and lower cam track can also be vaned to assure micrometer-accurate control of piston travel.

Filler is driven by the closing machine with connections specifically engineered (jointly by Pfaudler and Continental Can Co.), to assure smooth, synchronized operation, with elimination of shaking of containers and loss of product. A sheer pin sprocket serves to protect the filler

For coding, imprinting & counting labels

With speed and accuracy far beyond the limitations of hand stamping, a Tickometer can drastically cut the cost of coding, dating or imprinting your product labels and wrappers.

The Tickometer can handle up to 1,000 pieces *per minute*—eight to ten times faster than your most experienced manual workers. It cancels, endorses imprints and counts such other items as tags, coupons, tabulating cards, checks, production tickets, inspection slips—practically anything made of paper.

Rented, as well as sold, requires no capital investment. Service is available from 259 locations, coast to coast. Ask the nearest PB office for a demonstration—or send coupon for free illustrated booklet and case studies.

The Tickometer offers food and drug manufacturers and others an easier, less expensive way of dating or coding their products. Send coupon for free folder of case studies.

PITNEY-BOWES
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Counting & Imprinting Machine
Made by the originators of the postage meter . . . offices in 94 cities in U.S and Canada.

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☐ Send free Tickometer booklet ☐ Case studies

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each specifically developed for: CONVEYING INSPECTING SORTING

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RESISTS ANY ABSORPTION
Acids Fats Juices Alkalis Oils Moisture

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Completely impregnated. Dense and tough — yet flexible enough even for small pulleys. May be sterilized with hot water or steam. Available in white or brown.

WHITE NEOPRENE
Completely constructed with highest grade neoprene rubber, finished with smooth 3/64" cover. Friction surfaced pulley side. Also available in black. White Ruff or brown Kling Top for incline and decline conveying. Brown friction surface for conveying and sorting.

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Coated with opaque white or clear amber cellulose on both sides or on carrying side only. Smooth, to prevent clinging particles of food, etc. Washable with soap and water.

PLASCELL
Smooth white plastic surface that will not peel or flake. Easy to care for, can be brushed off, wiped with a damp cloth or cleansed with hot water. Also in green or maroon for simplified sorting, inspecting or sizing.

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from any serious overload that might be transmitted by the closer.

Filler speed is reduced by a magnetic brake. No separate brake action is required on the closing machine, where the hydraulic motor itself serves as a decelerating mechanism.

Filler is constructed of metals and materials resistant to corrosion by foods or such cleaning agents as are normally used. All parts in contact with the product are made either of Type 316 stainless steel or copper-free nickel alloy. All other exposed parts, including base and legs, are sprayed with zinc, then covered with a plastic paint.

The travel of containers around the filling machine is along a banked path to avoid spillage. Inward tilt of cans around this speedway can be adjusted —governed according to viscosity of product and also speed of operation.

Several factors contribute to the lesser maintenance required on the filler. Lubrication is largely automatic. All gears are immersed in oil. Most other moving parts are lubricated by an oil pump.

There are only three points requiring periodic lubrication. All of these are connected to a convenient header by tubing, so that lubrication can be accomplished at one location and practically in one operation.

Range of cans that can be filled and closed starts with a diameter of 202 and runs to a maximum of 306, and from a minimum height of 208 to a maximum of 708. Products that can be filled on the line include liquids, purees, or heavier semi-solids, with a range including products such as fruit and vegetable juices, beer and carbonated beverages, concentrates of soup and juice, and pulps and baby foods.

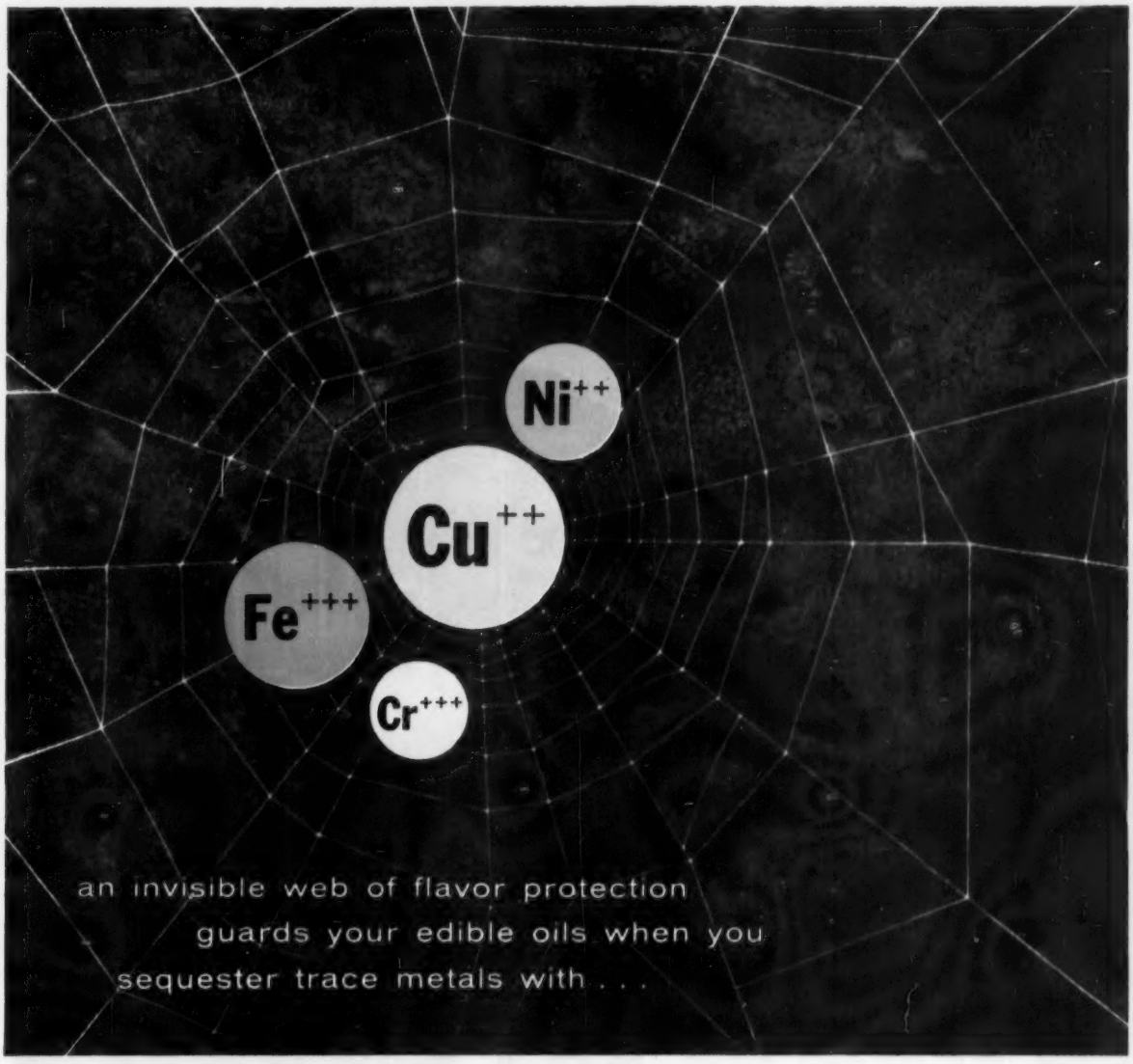
Dual Feed of Covers

Increased speed of cover feed to the turret, necessary to meet the accelerated speed of closing, is provided by two cover-feed mechanisms. Keeping these dual units supplied with covers is readily accomplished by one operator. The two cover-delivering mechanisms are actuated by the cans themselves as they pass through a magnetic field.

This specific trip-action cannot be interrupted or voided by splashing, dripping of liquids, or the presence of steam. And it has proved thoroughly dependable.

Easily and quickly replaced are the four station-type holders of the marking or coding device, which can be equipped with conventional embossing type dies. They may also use sharp face dies and floating nylon-wheel anvil.

Relief valves on the hydraulic mo-



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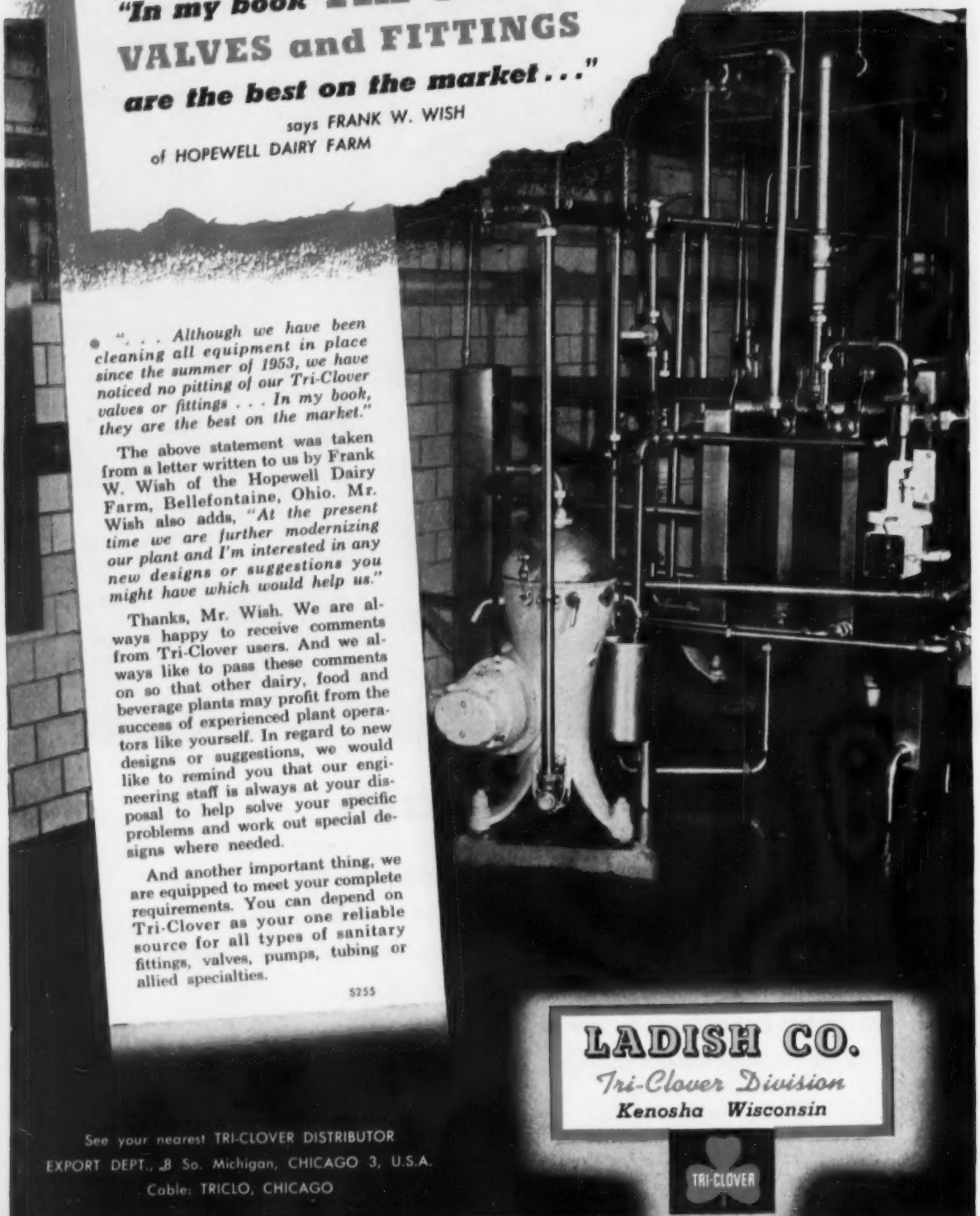
"In my book TRI-CLOVER VALVES and FITTINGS *are the best on the market . . ."*

says FRANK W. WISH
of HOPEWELL DAIRY FARM



". . . *Although we have been cleaning all equipment in place since the summer of 1953, we have noticed no pitting of our Tri-Clover valves or fittings . . . In my book, they are the best on the market.*"

The above statement was taken from a letter written to us by Frank W. Wish of the Hopewell Dairy Farm, Bellefontaine, Ohio. Mr. Wish also adds, "*At the present time we are further modernizing our plant and I'm interested in any new designs or suggestions you might have which would help us.*"

Thanks, Mr. Wish. We are always happy to receive comments from Tri-Clover users. And we always like to pass these comments on so that other dairy, food and beverage plants may profit from the success of experienced plant operators like yourself. In regard to new designs or suggestions, we would like to remind you that our engineering staff is always at your disposal to help solve your specific problems and work out special designs where needed.

And another important thing, we are equipped to meet your complete requirements. You can depend on Tri-Clover as your one reliable source for all types of sanitary fittings, valves, pumps, tubing or allied specialties.

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tor can be pre-set. These, along with roller clutches, protect the machine. In addition, all gearing and rolling clutches, which are located in the overhead drive housing, run in oil.

From one of three manifolds outside the base, separate, marked copper lines, lead to all bearings and gears in the base. Head lubrication, as mentioned, is of bath type. Thus lubrication is simple and fast. Furthermore, all exposed shafts and gears are made of non-corrosive heat-treated metals. The base is of rust-proof Ni-Resist. It is three-point supported to permit both thorough and rapid cleaning.

In this Heinz plant, filling and closing units occupy very little floor area in proportion to production capacity. The 1,000/min. filling and closing is accomplished in approximately 8x15 ft. (actually less than 120 sq. ft.).

Amount of labor required is no more than for the operation of conventional units. Here, however, output is much higher, hence labor cost per case is greatly reduced.

End (*Resume reading on page 63*)

Legal Tips

—*Continued from page 111*

sells food purchased from a manufacturer, and the consumer becomes ill, who is liable?"

The answer remains: The manufacturer, wholesaler, and retailer may be jointly liable.

Generally, though, the retailer is solely liable if the merchandise was not in a sealed package and the retailer had the opportunity to inspect the merchandise and failed to use reasonable diligence to discover the defect and eliminate it. A higher court so held—in *Vogel v. Thrifty Drug Co.* (259 Pac., 2nd, 450).

For comparison, see cases where the courts have held against the manufacturer. For instance, a husband and wife recently stated that they became ill from drinking milk contaminated by some unidentified substance in the milk carton they bought. And the court held the dairy liable, pointing out that the carton was sealed at the dairy and unbroken until opened by the consumers.

Failed to Remove Body-Heat

According to a late high court, a warehouseman is liable in heavy damages when he fails to remove body heat of animals, poultry, and the like, by "sharp freezing" or chilling such merchandise before storing it.

For example, in *Adams v. Lambert* (108 N. E., 2 d, 241), one Adams, owner of turkeys, contracted with a warehouseman to freeze and store such turkeys at an agreed price per month.

A month later it was discovered the turkeys had spoiled, and Adams was compelled to sell them at 1c. per pound. He then sued the warehouseman for damages amounting to the difference between 1c. a pound and the going market price of good birds.

The trial revealed that the warehouseman placed the turkeys in sealed cellophane bags before their body heat was removed; that he hadn't chilled them; and that he was negligent in failing to inspect them on this score.

Also, testimony was given that the warehouseman had stacked the turkeys in a large pile so that cold air could not circulate in and around them.

In view of this evidence, the lower court held Adams entitled to full damages. And the higher court approved, saying:

"The record discloses credible evidence supporting one or more of the specifications of negligence."

Speculation Not Good Enough

Irrespective of the kind of damage suit, the court will not award damages based on "speculation." This rule is particularly applicable in suits involving loss of profits of a company engaged in manufacturing food.

For illustration, in *Fireside Marshmellow Co.* (213 Fed., 2d, 16) the testimony concerned a party having a contract with the Fireside organization for the laying a concrete floor in its marshmallow plant. The company sued the contractor for damages, alleging the floor, as laid, was not in accordance with the contract specifications and had to be removed.

And there was evidence the company was actually prevented from fulfilling any orders it had on hand—due to the delay. The officials testified that in their opinion the loss was $1,000 a day.

But the higher court refused to award them damages, saying:

"On the question of damages the evidence was so conjectural and speculative that it did not form a legal basis for determining its amount, if any and the evidence was insufficient to prove that the plaintiff (company) in fact lost any sales of its products."

Ordinarily, a gas corporation cannot be held liable for cutting off gas service, when this action prevents a consumer from operating his food processing business—if the claimed damages are speculative.

So said a recent court, explaining that as a general rule the expected profits of a commercial business are too uncertain, speculative, and remote to permit a recovery for their loss.

In *Atlanta Gas Light Co. v. New-*

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man (76 S. W., 2d, 536), the latter named sued for damages caused by the interruption of the gas service to his plant.

The testimony showed that one evening the gas company's employes were cleaning filters at the company's generating plant when an explosion occurred due to employee negligence in cleaning the filters. As a result of the explosion service to the plant was interrupted for days.

Newman asked the court to allow damages, but the higher court refused to hold the gas company liable, and said:

"The profits of a commercial business are dependent on so many hazards and chances, that unless the anticipated profits are capable of ascertainment, and the loss of them traceable to the defendant's (gas company's) wrongful act, they are too speculative to afford a basis for the computation of damages."

On the other hand, this court explained that the loss of profits from the interruption of an established food processing business may be recovered if the amount of actual loss is rendered reasonably certain by competent proof.

Premiums—for Dead Insurance

As previously stated in these pages, persons may faithfully pay premiums to insurance companies when, in fact, the policies are actually dead.

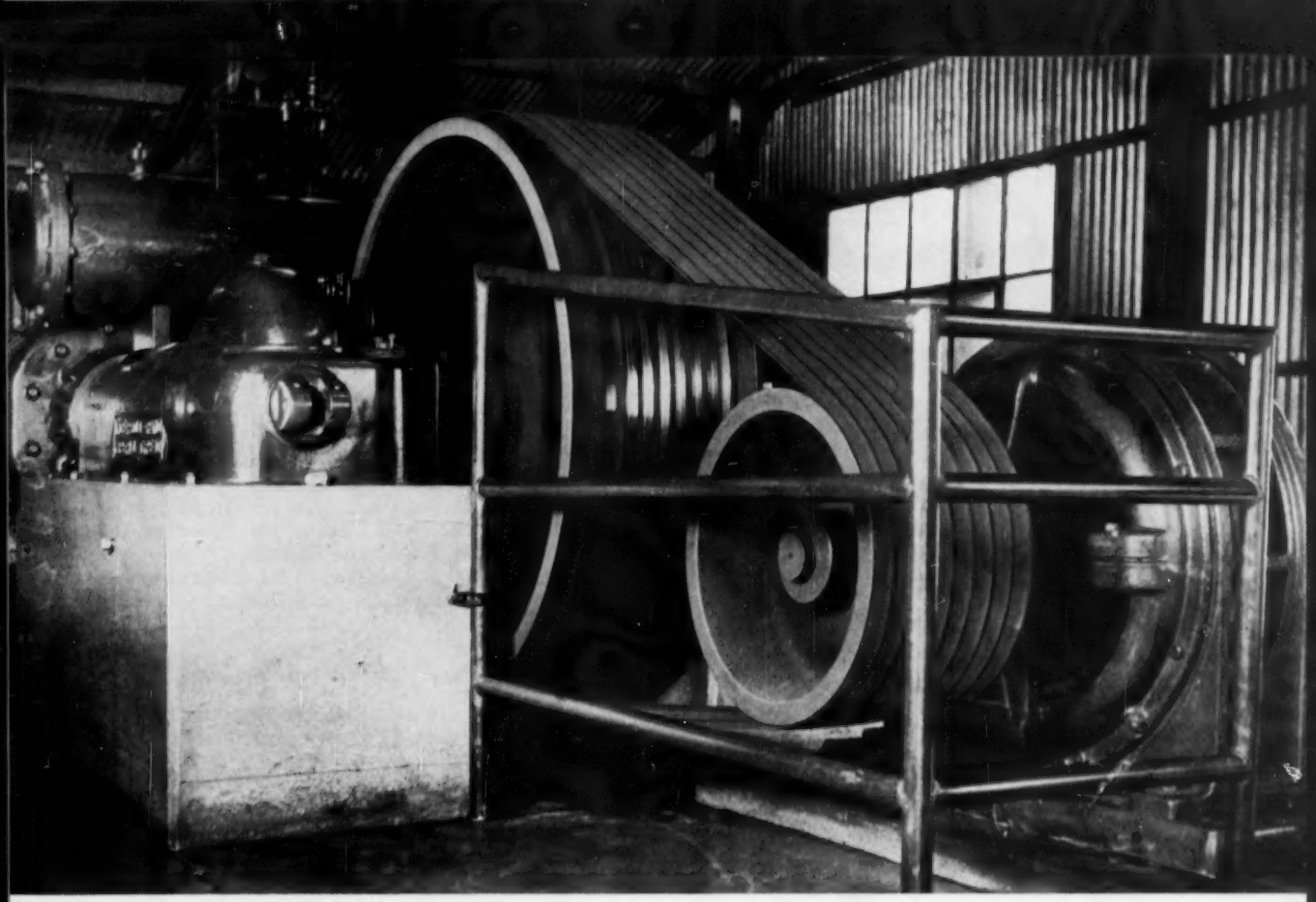
An excellent motto is: Read your insurance policies and carefully abide by all clauses. If you fail to do so you may be shocked when, after a loss, you learn your policy is worthless.

Thus, in *Hartford Accident & Indemnity Co.* (268 S. W., 2d, 419), the circumstances concerned a motor-truck owner named Blake, who held an auto liability insurance policy stating his truck was used in hauling food products exclusively for a man named Low, as well as for occasional use in "other business purposes."

But without notifying the insurance company that he had stopped hauling for Low, Blake began transporting the same kind of merchandise for another company. And then his truck figured in a bad accident.

The lower court then held that the insurance company was liable on its policy. However, the higher court reversed the verdict, declaring:

"It is evident that prior to the accident the insured (Blake) was not hauling for Low at all, much less exclusively. Since the restrictive coverage was reasonable, and since the use of this truck at the time of the accident did not come within the terms of the policy, even if extended to 'occasional use,' the appellant (insurance com-



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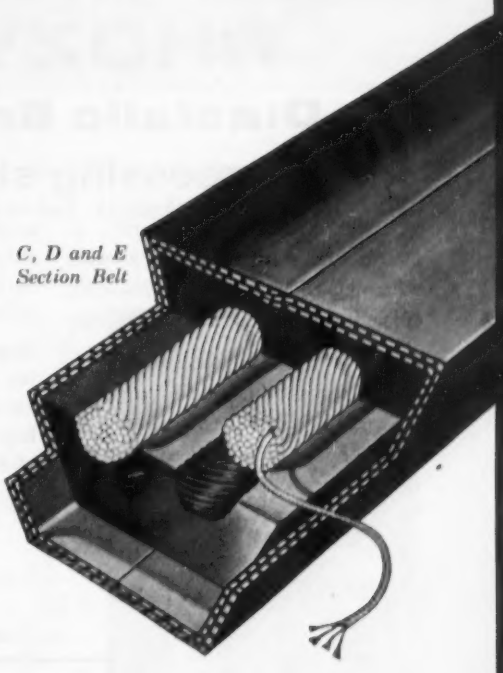
Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of any plant service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



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If you want to improve the processing of your starch-containing foods, we will be glad to discuss with you how the *specific* and *controlled* action of RHOZYME enzymes can help.

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pany) should not have been held liable."

The strange part of the above case is that *simply because Blake failed to notify the insurance company of the change he had made,* the higher court held he had voided the policy, relieving the insurance company of its normal obligations.

End (Resume reading on page 111)

Electro-Smoke Curing

—Continued from page 105

with the fish given a positive charge.

Notable is the fact that this system sterilizes better than the old process. This is credited to the conversion of methanol in the smoke to a nascent aldehyde.

Now—"Solution" Technique

In the new smoke-solution method, smoke from moist sawdust—of broadleaf trees—is passed through a cylindrical electrode. D.c. voltage of 100 kv. causes smoke and vapor to condense and fall into a well. Water is added and the soluble component dissolves to form an 8-10 Baumé solution—transparent and light brown in color—which is very stable and has the flavor characteristics of smoked food.

A 3-4 Baumé dilution of this smoke-solution, with the addition of some salt, exerts high osmotic pressure on the immersed product and will cure even large fish in several hours, with high uniformity of penetration.

Canners can smoke products quickly by putting small amounts of this liquid into cans of raw meat or fish before processing.

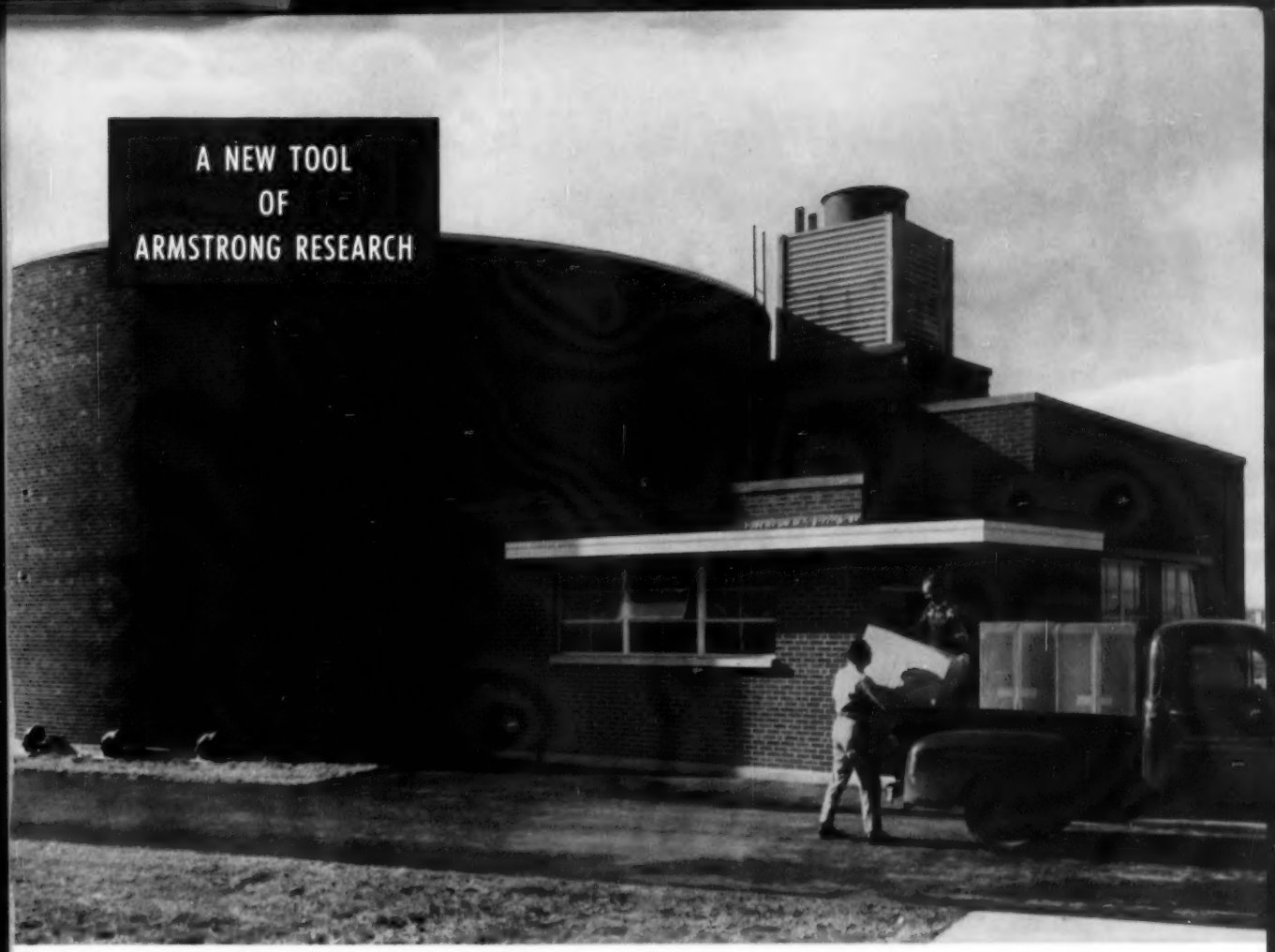
Excellent luster is given to the skin in both of these new procedures.

In the combination method, now proposed, there might be partial drying in the smokehouse followed by immersion in the solution—thus winning in one process, the benefits of both operations.

Fact is, that the electrostatic method of curing and the smoke-solution treatment (both covered by Japanese patents) are so quick they preclude proper drying. Hence, additional drying is necessary using infrared lamps or other heat sources.

Editor's Note: A number of other possible applications of the electrostatic process invite exploration—enrobing chocolates, candies, and cookies; coating meat carcasses and fresh fruits and vegetables to prevent evaporation; glazing products for freezer storage; and coating popcorn with cheese or butter.

End (Resume reading on page 107)



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The large circular chamber can be held at temperatures ranging from 0° to 160° F., with humidities accurately controlled from dry to practically saturated conditions. Complete test rooms are then built inside this controlled chamber and operated at temperatures from 100° below zero to 200° F. This flexible arrangement permits accurate control of conditions on both sides of an insulated wall.

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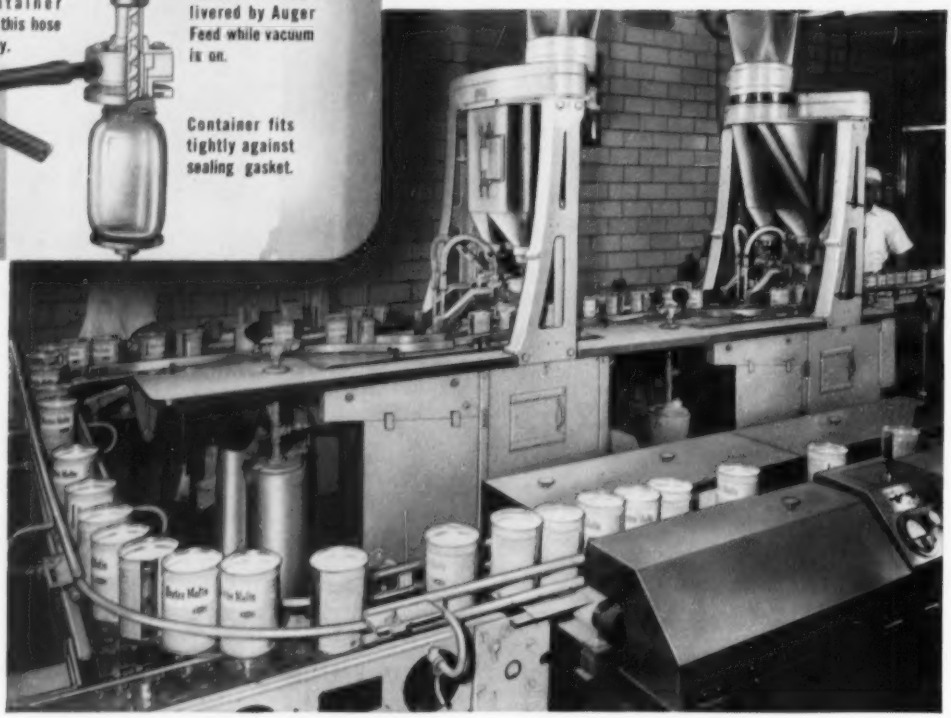

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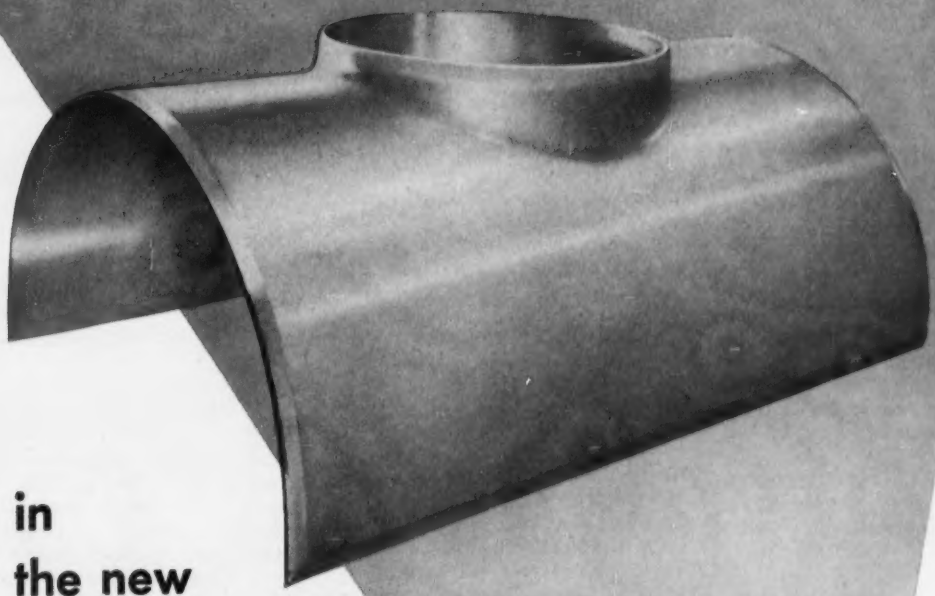

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Useful New Books & Government Publications

Quality Control Guide

CAMPBELL'S BOOK ON CANNING, PRESERVING, PICKLING *By Clyde H. Campbell. Published by Vance Publishing Corp., 139 N. Clark St., Chicago 2. 1950. 222 pages. 9 x 12 in., cloth. Price:* $10.00.

A recognized necessity for the food industry reference shelf, this book is of particular value for operation and production superintendents. The many charts, tables, and formulas may be taken directly from the book and applied to your own plant as a quality control check.

Fully illustrated, it provides specific information on products packed in metal or glass containers, as well as the recommended fill for various container sizes.

Detailed and comprehensive sections cover canning of fruits and vegetables, specialty foods, preserving, vinegar making and pickling, mayonnaise and other oil dressings, meat and poultry processing, and quality control procedures.

For Bakers and Brewers

INDUSTRIAL FERMENTATIONS, *Vol. I and II. Edited by L. A. Underkofler and R. J. Hickey. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York City 10. 1954. 565 pages (Vol. I), 578 pages (Vol. II). 5¾ x 8¼ in., cloth. Price:* $12.00 *each volume.*

Of particular interest to food processors whose operations deal specifically with fermentation—brewers, yeast manufacturers, wine distillers, bakers, and vinegar manufacturers—this two volume work provides a clear and comprehensive picture of the whole industrial fermentation field.

Chapters are included on alcohol fermentation of grain, molasses, sulfite waste liquor, wood waste; the brewing industry, table and dessert wine production, glycerol, lactic acid, citric acid, gluconic acid, acetic acid, fungal amylolytic enzymes, riboflavin, and fermentations in waste treatment.

Formulas for Food

NEW PRACTICAL FORMULARY *By Mitchell Freeman. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York City 10. 1955. 376 pages. 5¾ x 8¼ in., cloth. Price:* $7.95.

A complete and authoritative collection of almost 2,500 formulas for such diversified products as disinfectants and inks, this book contains dozens of food formulas. These range from detailed ingredient measures for gum drops to a foam inducer formula.

The instructions for preparation are clear and concise enough to be of aid to either the beginning or experienced chemist.

First part of the book presents a practical outline of the chemical manufacturing plant and treats with such basic operations as heating, dissolving, digesting, emulsifying, drying, refrigerating, and roasting. Second section is the formula collection. A full appendix and bibliography contain tables of value to the reader on weight conversion, Baume degrees, and temperatures.

For the Food Lab

PAPER CHROMATOGRAPHY AND PAPER ELECTROPHORESIS *By R. J. Block, E. L. Durrum, and G. Zweig. Published by Academic Press Inc., 125 E. 23d St., New York City 10. 1954. 247 pages. 6¼ x 9¼ in., cloth. Price:* $5.80.

Fast attaining recognition as valuable tools in the food research laboratory, particularly in the qualitative and quantitative analyses of amino acids, amines, proteins, and carbohydrates, paper chromatography and electrophoresis are now explained in an authoritative and comprehensive work.

The growing acceptance of the two methods has rapidly outdated earlier references, making the up-to-date coverage provided in this volume a definite necessity. Basic principles are reviewed and outlined so that established techniques may be re-evaluated and new procedures and applications may be described for a variety of substances.

All of the important procedures are covered in detail, a complete bibliography providing the reader with an extensive field for further research and guidance.

Preserving Food

RADIATION BIOLOGY *Vol. II Edited by Alexander Hollaender. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 593 pages, 6½ x 8¾ in., cloth. Price:* $8.00.

The second in a three volume series, this book deals with the ultraviolet spectrum and its effect. Those concerned with food preservation will be particularly interested in the work, which includes sections on practical applications and sources of ultraviolet energy, technique of study of biological effects of ultraviolet radiation, and radiation effects on fungi and bacteria.

FE REPRINTS AVAILABLE

Difficult-to-find practical information on food plant operations and materials is available in the "roundup" reports and articles listed below. Single-copy reprint prices are given. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

8. Newer Ingredients $1.25

Twenty-page report on the newer ingredients which aid in producing better food products (May, 1952). It includes detailed articles on these subjects: (1) Guide to Optional "Chemical" Additives. (2) Antioxidants Provide New Flavor Controls. (3) Industrial Enzymes Now Speed Natural Processes. (4) Food Emulsifiers Bring New Highs in Uniformity. (5) Seaweed Extractives Find Versatile Uses in Foods.

9. Quality Control $0.75

Nine-page report on simplified statistical quality control for practical food product improvement (Dec., 1952). New reference-table method is presented. It shortcuts complex mathematics of statistical technique, is especially suited to food plant operations.

10. Packaging Materials $1.00

Sixteen-page report on how to get better production-line performance with packaging materials and containers (March, 1952). It includes these comprehensive articles: (1) Developing Your Package for High Output. (2) How Properties of Materials Affect Packaging Speeds. (3) Nipping Production Slowdowns by Pre-Checking Supplies. (4) Tips on Ordering Materials for Top Performance. (5) Proper Storage of Your Stock Averts Line Headaches.

11. Sanitation $0.50

Six-page report on "How To Assure Top Sanitation in Your Processing Equipment" (Jan., 1952). This report was a preprint of one section of a practical book on food plant sanitation prepared by Association of Food Industry Sanitarians.

12. Materials Handling $1.00

Twelve-page report entitled "How Modern Materials Handling Gives New Spurt in Processing" (March, 1951). Case histories of important savings through more efficient handling are presented. And the different types of handling equipment are described and illustrated.

13. Mixing $0.50

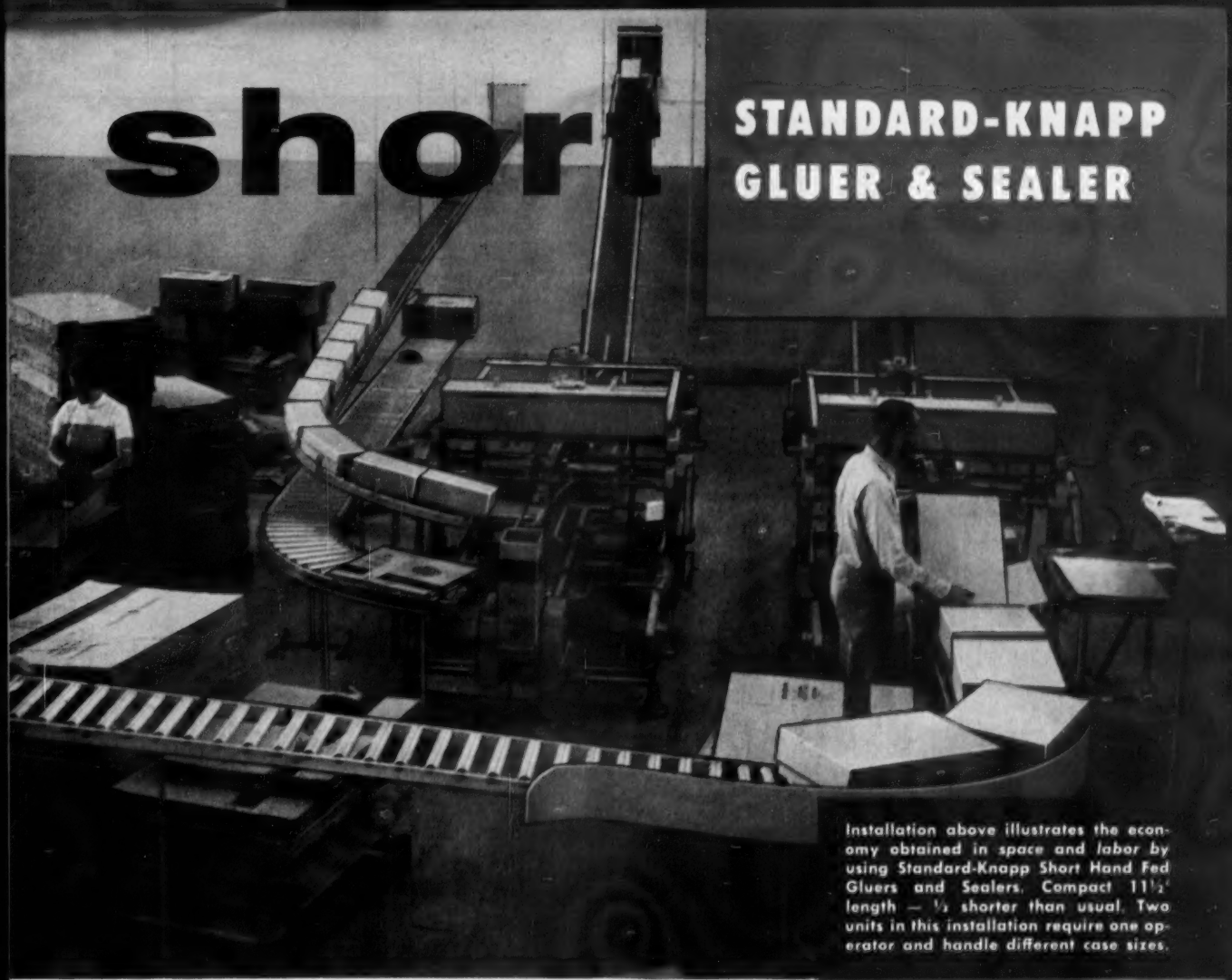
Four-page roundup of progress in plant mixing methods and equipment, plus a forecast of what is ahead (Oct. 1953). Performance data are included as yardsticks of what can be achieved.

14. Aseptic Canning $0.75

Eight pages, including foldout picture flowsheet, describe, evaluate, and illustrate in detail the continuous, short-time, high-temperature aseptic canning process that won the 1951 Food Engineering Award. (June, 1951).

short

STANDARD-KNAPP GLUER & SEALER



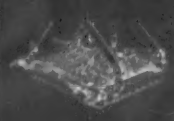
Installation above illustrates the economy obtained in *space* and *labor* by using Standard-Knapp Short Hand Fed Gluers and Sealers. Compact 11½′ length — ⅓ shorter than usual. Two units in this installation require one operator and handle different case sizes.

DOES A BIG JOB IN SMALL SPACE

Standard-Knapp's Short Model 429 Case Sealer is designed to get a lot of work done in a minimum of space. This compact unit, which both glues and seals manually fed cases, is only 11½′ long. Yet it handles a wide range of case sizes and will glue and seal top or bottom flaps or both at speeds up to seven cases per minute. Higher speeds are possible if desired.

Featuring close-coupled integration of gluer and compression units, the 429 Short is built to the same high standards for which Standard-Knapp equipment is famous. You can count on cases that are tightly, squarely and uniformly sealed — with printed matter unobscured. We will be happy to give you complete details.

Please write Dept. F, Standard-Knapp, Division of Emhart Mfg. Co., Portland, Conn., for descriptive material.



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GLUERS AND SEALERS

UNSCRAMBLERS

LABELERS

PLUS other machines for a complete line or single unit.

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STANDARD-KNAPP

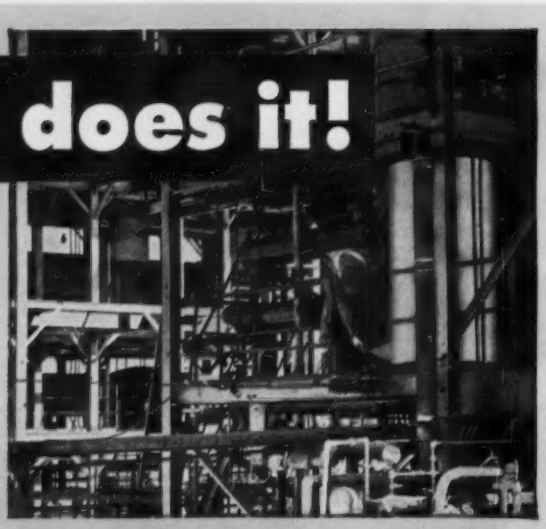
Division of Emhart Mfg. Co.

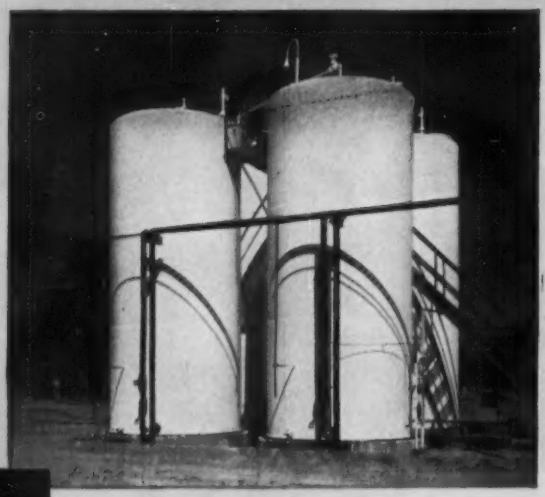
PORTLAND, CONNECTICUT

LATIN AMERICAN REPRESENTATIVES: American Steel Export Company, New York, N. Y.

EPON® RESIN does it!

New paint lasts years ...resists corrosive spillage at Diamond Alkali plant





HERE'S HOW...

PAINT LEADS a hard life at the Diamond Alkali Company agricultural chemicals plant in Houston, Texas . . . and no ordinary paint can survive there for long!

A few reasons for paint failure: Processing vessels and storage tanks are subjected to spillage of chlorinated hydrocarbons and benzene, and some also to heat. In parts of the plant, painted surfaces are exposed to the highly corrosive fumes of hydrogen chloride and sulfuric acid.

In their search to find a tougher, longer lasting paint, Diamond Alkali maintenance men tried coatings of many types, including heavy duty maintenance finishes. Some "washed off" immediately; some lasted 6 to 8 months. Finally, Epon resin coatings based on the XA-200 formulation were tried — and found outstandingly successful.

The Epon cold-cured paint, applied by spraying throughout the entire plant, has been in service for *more than two years with no failure.* Painting costs — for both material and labor—are a mere fraction of what they formerly were, reports Diamond Alkali.

Call on our sales offices for names of suppliers who sell Epon resin coatings for your needs. Write for the full Epon coatings story in the new brochure, *"Planning to Paint a Pyramid?"*

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Pests Prefer Noodles

Favor for egg noodles over macaroni on the part of pests that infest stored products has been indicated in recent tests.

The preference ratio was 2 to 1 in these experiments which were performed with confused flour beetles, sawtoothed grain beetles, Indian meal moths, and black carpet beetle larvae. And as a result, increased control is urged, along with greater care in clean-up of egg-noodle processing units.

Researchers cited five avenues of contamination for this product:

1. Infestation originally in flour
2. Infested dumping and handling units
3. Contaminated dryers
4. Insects breeding in packaging materials or storage areas
5. Regrinding and use of infested returned goods

The tests were conducted by a joint team, consisting of T. L. Hugé, of American Sanitation Institute, Div. of The Huge Co., Inc., and H. G. Stanway, of Skinner Mfg. Co.

More Sugar the Ion Way

Further word on the new ion-exchange method of purifying sugar cane juice (FE Jan., p. 194): USDA scientists in Louisiana now report up to 15 lb. more sugar yielded per ton using this technique. Also that it will work equally well with cane from Florida, Puerto Rico, and Hawaii.

New process eliminates sugar inversion and removes minerals, organic materials, and coloring matter in one operation. This leaves juice approximately the same color as fully refined sugar.

Additional data is available from C. H. Fisher, Chief of Southern Utilization Research Branch, USDA, 2100 Robert E. Lee Blvd., New Orleans.

Poultry Men Elect

Institute of American Poultry Industries has named the following new officers for fiscal year beginning May 1: President, Dr. C. D. Carpenter; chairman of board, P. G. Gray, Jr.; vice chairmen, M. J. Goodrich, H. Creighton, and G. Hess; Sec.-Treas, W. F. Priebe, Jr.; and Asst. Sec.-Treas., C. Pratt.

Food Additive Showdown Is Imminent; Delaney, O'Hara, Priest Launch Bills

It now appears virtually certain that there will be a food additive legislation showdown in Congress this year.

This became apparent when two different bills that would regulate intentional additives were put in the legislative hopper.

One came from Rep. James Delaney (D., N. Y.), chairman of the former select investigating committee. Another approach was embodied in identical bills introduced by Reps. Joseph O'Hara (R., Minn.) and by Percy Priest (D., Tenn.), chairman of the committee which must consider such legislation.

The O'Hara and Priest bills (HR 4099 and 4100) were introduced for the "Chicago Group," which includes the Millers National Federation, American Institute of Baking, ice cream manufacturers, and others.

The details are almost the same as in the bill launched last year by O'Hara for the same people. However, it has been rewritten in part. And Washington observers feel it is now a better bill. With some modifications, it keeps the framework of prior FDA approval of new food additives.

Alters Definition

Significant change came in the definition of what is a "new chemical additive" and in the criteria which the Secretary for Health, Education & Welfare is to use in determining whether a proposed ingredient is harmless to man, and thus approvable.

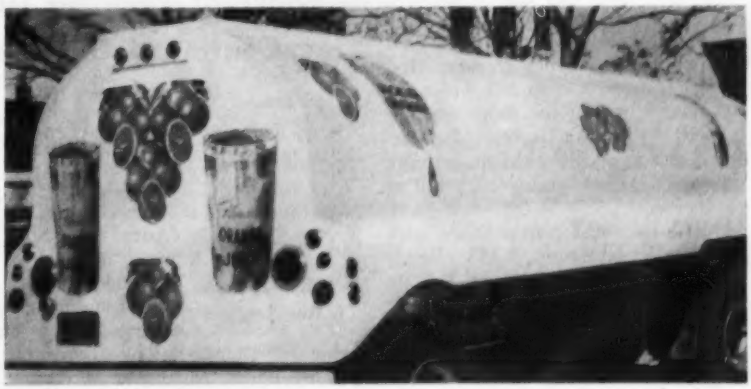
By the definition, an additive would be exempted if adequately shown through scientific procedures or through prolonged use in food "to be a substance without hazard to man in its intended use."

Previously, the quoted phrase read "not to be a poisonous or deleterious substance for its intended use."

The other major change is this: Last year's bill would have allowed the Secretary to turn down an additive on any one of four factors, including "the functional value of the proposed additive for its intended use." This same phrase appears in the new bill—but with the added provision that the Secretary may not base refusal "solely on the grounds that the applicant failed to show the functional value of the proposed additive in its intended use."

Delaney's bill (HR 4475), written for him by the counsel of his former select committee, Vincent Kleinfeld, generally follows the prior approval procedures set up in the Miller pesticide bill, but says that a manufacturer, in submitting an application, must make a statement of intended use "demonstrating that such employ-

(*Turn page*)



Orange Juice On the Road

Fresh-squeezed orange juice is now rolling by tank truck from Miami to New Jersey in 40 hr. And the operator, Orange Fruits Corp. of Newark, plans expansion to a 10-unit fleet of these plastic-tank trucks (Heil) to supply local housewives with cartons of tree-fresh juice. Quality is maintained by a stainless steel tank lining and air-tight insulation, said by maker to hold temperature rise to less than 1 deg. F. during trip.

NCA Considers Shelf-Life, Bacteria, Diet Foods, Restaurant Promotion

How to attain increased shelf-life for canned foods was a leading theme at the recent National Canners Assn. meeting in Chicago.

Spotlighted, too, were bacteria and pesticide factors, points on dietetic foods and restaurant promotion.

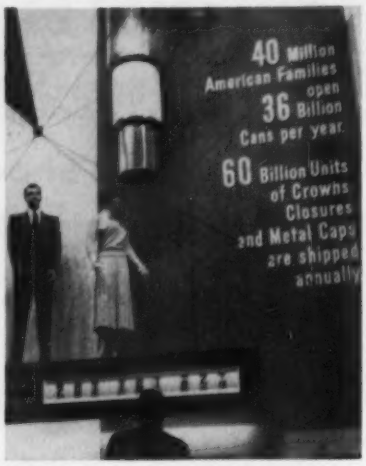
Three papers particularly highlighted shelf-life factors:

Temperature effect: Essential role of cool storage temperatures was emphasized by Dr. D. K. Tressler, QMC Institute. He specifically noted that speed of chemical reactions—those responsible for unacceptable flavors and color changes—is doubled for every 18-deg.-F rise in storage temperature.

Headspace and vacuum aspects were accented by A. G. Skibbe, Continental Can Co. He recounted experiments on packs of blueberries, tomatoes, and apricots, where it was indicated that higher storage life is directly related to amount of headspace in the can and the initial "flip" vacuum (gaged by applying external vacuum to can until end flips out). This check, said Mr. Skibbe, gives a more accurate forecast of future life.

Tin plate vs. rust was the key question examined by A. R. Beall and E. V. Cassaday, American Can Co., who reported indications that "thickness of tin coating on cans has only a slight effect in prevention of rust."

Most canners, they said, can use #25 electrolytic-plate cans successfully by maintaining dry storage of finished goods. Where storage conditions will be extremely severe, post-coating of the sealed cans with phenolic resins provides maximum protection.



1,000-Plus Cans Per Second
—are now being opened in American homes across the land. This was dramatically impressed on visitors at recent National Canners Assn. meeting in Chicago by graphically speeding counter (above). Exhibit was sponsored by U. S. Steel Co.

Bacteria and Pesticides

Two papers considered bacteria and pesticide aspects. Cited by C. Wallace Bohrer, NCA Lab, was the prime part vigorous initial washing plays in eliminating the soil bacteria that are blamed for ultimate spoilage.

Then Charles E. Palm, Cornell U., speaking on effects of the Miller Pesticide Act, advised processors to encourage growers in use of label-accepted pesticides.

Growers, he said, must be directed not to "double" dosages, and not to apply pesticides later than recommended date in the growing season. He continued that canners—facing responsibility under the Act—must set up residue-testing of raw materials.

Dietetic-Food Points

Unintentional addition of salt, either during unit operations or due to use of high-sodium water, was targeted as requiring special control in processing dietetic packs.

The speaker, Franklin C. Bing, nutrition consultant, then called for more explicit dietetic labels—giving mg. of sodium per 100g. of food, and also per serving, on cans of water- and juice-packed fruits and vegetables.

Big Restaurant Potential

Canners have "let the restaurant market develop by default," declared a restaurant man—George D. Hanby, Cooley's Cupboards, Evanston, Ill.

Fact that many restaurant buyers "think first of fresh foods, then of frozen, and last of canned has little to do," he said, "with the real qualities of canned foods." He related this situation to the canners' defaulting tendency, in the face of "tradition" of the fresh foods and the stealing of a march" by the frozen food processors.

Canned-food processors could, he said, make special efforts to tell their story of quality and convenience to the restaurant tradesmen, who annually buy $900 million worth of fruits and vegetables.

Additive Bills (Cont'd)

ment of the chemical additive will serve a purpose which will be useful to the consuming public."

The Secretary may approve such additive when it is not poisonous or deleterious at any level; or when, if poisonous or deleterious at some high rate of use, it nevertheless is safe and required for its intended use."

Rep. Priest told FOOD ENGINEERING he doesn't feel irrevocably committed to the Chicago Group bill which he introduced, saying his move was intended "to get the Grocery Manufacturers Assn. and the Manufacturing Chemists' Assn. working on a bill of their own."

MCA had held conversations with Charles Wesley Dunn, GMA counsel (as well as chairman of the N. Y. State Bar Assn's Food, Drug & Cosmetic Law Section). But full agreement reportedly has not been reached between GMA and MCA.

Effective deadline for submitting other bills would, of course, be the date of hearings on the food additive bills already introduced. And it's now a good bet that hearings won't be held before late May or early June.

"Constant Push for Ultra-Quality Will Assure Continued Climb of Frozen Seafoods"

J. Roy Duggan

Seen as a "must" for the frozen seafood field is a continuing drive targeting ultra-high product quality, accenting research and also closer dock-side control, and trending toward adoption of voluntary standards by processors.

This policy pattern is specifically prescribed by J. Roy Duggan, newly elected president of SeaPak Corp., St. Simons Island, Ga., as the means for maintaining—and further spurring—the improvement now being enjoyed by the field following the discouraging sales of the postwar years.

Particularly cited by Mr. Duggan, who has been general manager, vice-president, and treasurer of the company since its reorganization five years ago, is the present strong climb in consumer response to the seafood items, based on the buyers' growing confidence in its quality.

"Companies such as our own," he says "have increased sales at close to 100% per year for the past three or four years. Today," he adds "inventories of frozen fish and shellfish are high, in some cases at record peaks. But so great are sales expectations for '55 that prices are firm at moderate levels on most items."

The following four recent develop-

ments, each tying in with quality improvement, are hailed by Duggan:

1. Production of standard 1-lb. frozen fish fillets.
2. Perfection of pre-cooked frozen seafoods.
3. Introduction of frozen breaded shrimp.
4. Development of fish sticks.

Statistics show 52% of families use frozen fish and 20% buy frozen shrimp. Accenting these figures is the overwhelming acceptance—especially by children—of fish sticks.

All told, a larger market potential looms. And further reflecting the possibilities is the fact that electrical manufacturers have been installing home-kitchen fry-wells at a rate of 1 to every 6 families and are now incorporating these facilities in kitchen ranges destined for new homes.

Hors d'Oeuvres

▶ **Russia's reshuffle has one clear, simple meaning—that even the Commies like to eat. And it proves again that the free-wheeling plowshare is mightier than H-bombs. Sort of refreshing to see values put into the right perspective.**

▶ When Napoleon wrote his specifications for food preserved by canning, he failed to require that the product go through an atomic explosion without becoming radio-active. Now that has to be tested. Short-sighted guy, the Little Corporal.

▶ **Stuffed frozen turkeys can be shoved right into the oven and roasted in the skin-tight Cryovac bags in which you buy them. True, you do have to light the fire.**

▶ The plant from which cocoa and chocolate originate is named *Theobroma Cacao*, which means "Food for the Gods." Not a bad name, considering the price of chocolate.

▶ **Potato chips were discovered by one of the Indian Cooks in Mrs. Moon's Boarding House at Saratoga, N. Y., 102 years ago. Now 11% of the potato crop goes into Saratoga Chips, although today's generation never heard of them.**

▶ Seven out of ten buying decisions on all bakery products in supermarkets are made after shoppers enter the store, Du Pont reports. Temptation is a good salesman.

▶ **Canned water we'll need, come H-Bomb Day. And the American Can researchers point out that the product is not as simple as it seems. Hardness, pH, and oxygen all pose problems. Maybe dehydrated water is a better answer.**

▶ Use of aromatic chemicals in flavors didn't start until the end of the 19th century. Seems tasty living is a relatively recent development.

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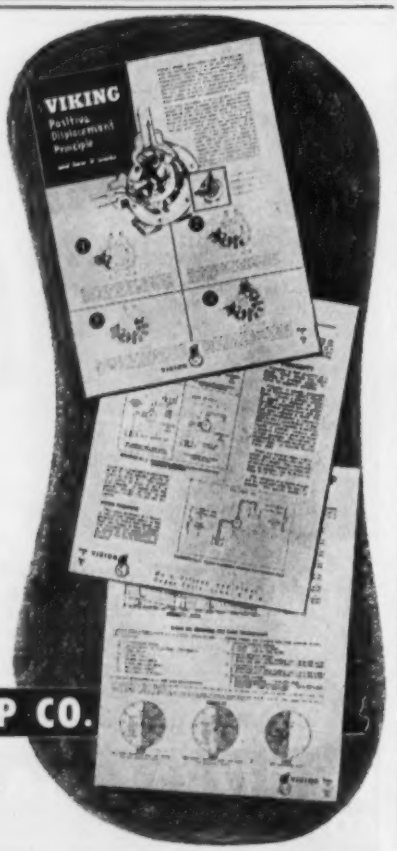

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For Superior Sanitation

New honor award to bakeries that achieve very high cleanliness has been set up by American Sanitation Institute, St. Louis. Here, Executive Director Holmes (right) presents honor plaque to Manager Overholt of Merchant's Wholesale Bakery, Marquette, Mich. Seal (on wall) can be used in any way—on bread wrappers, letterheads, invoices, and like, to acquaint public with bakery's superior status. Regular inspections by representatives of ASI determine the winning bakeries.

Bacteria "Burn" Wastes, Cutting Dairy Expenses

Cuts of 90% in labor expense are cited with use of a new air-and-bacteria method of disposing dairy wastes. And the equipment is stated to cost only a third as much as small conventional systems.

Moreover, commercial dairies initially adopting the technique reportedly are now able to process much more milk.

In operation, mixed sewage and air are pumped through a sludge of bacterial cells in a tank. Bacteria and oxygen then "burn up" proteins and sugars in the wastes. Treatment for 8-16 hr. reduces material to clear water, which can be discharged. Remaining sludge acts as starter for next day's operations.

Odorless and automatic, the system was developed by USDA Eastern Regional Lab in cooperation with Penn. State U. Six more of the units are now under construction.

AIB Alumni Elect Officers

The Alumni Assn. of American Institute of Baking has elected the following officers for 1955:

President, Henry Milroy, Deppe-Vienna Baking Co., Chicago; 1st V.-P., Evert Kindstrand, Peterson Oven Co., Chicago; 2nd V.-P., Edward Alesch, Western Condensing Co., Appleton, Wis.; 3rd V.-P., Oscar Cecutti, Cecutti's Bakery, Sudbury, Ontario; and Sec.-Treas., Charles L. Ulie. Ralph Fagally, Standard Brands Inc., Chicago, was elected to four-year term on board.

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Now comes the 1955 Model HA — a completely new design — with twice the digging power, lifting capacity and carrying capacity and 50 to 100% greater production capacity.

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Outstanding features:

16⅔% more bucket capacity:
PAYLOAD capacity ..... 18 cu. ft.
Struck-load capacity ..... 14 cu. ft.

Powerful "break-out" digging action Upward rotation of the bucket combines with forward motion of machine in a powerful slicing action that gets full loads quickly, even from lumpy, sticky or heavy materials.

Bucket tip-back of 40 degrees when only 6 inches off the ground carries heaped loads *low* and *close* for maximum stability, balance and safety.

New standards of safety Boom arms and parts are mounted *low* and carry loads *low* and are always clear of the operator. Operator visibility is good at all times.

Advance-design hydraulic system includes: sealed, pressurized hydraulic tank — no breathing of dirt and grit into hydraulic fluid; hydraulic accumulator prevents pressure shocks — gives easier, safer control.

Torque-converter drive and full-reversing transmission with two speed ranges insures fast moves in either direction — easier operation and control — more production.

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Store up to 35,000 gallons

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Glassed both inside and out, the UTILITANK (storage tank) won't rust, will never need painting. Think what you save in terms of maintenance.

You can store inert or mild products in these tanks, which range in size from 1,000 to 5,000 gallons. Syrups, juices and edible oils are typical of the products which are kept completely free from contamination by the smooth, nonadhering glassed surfaces.

Easy to clean

Cleaning costs are negligible, because you can rinse these tanks clean in a few short minutes.

Initial cost of all glassed steel storage tanks is low. For UTILITANKS, it is less than $1 per gallon in the 1,000-gal. size, ranging down to 50c per gallon in the larger sizes.

CHEMSTOR* horizontal storage tanks handle corrosive acids up to 15,000 gal., 125° F.

With the extra corrosion resistance of No. 28T glass on the inside, a CHEMSTOR tank will store your acid product without any contamination of the product or deterioration of the tank.

Available in standard sizes up to 15,000 gallons, these tanks may save you considerable money in maintenance —as well as help you produce a purer food item.

Cost is low—less than $1 per gallon in all but smallest sizes.

Also stores mild products up to 35,000 gallons

The same style of CHEMSTOR tank as described above is also available to you in larger capacities—up to 35,000 gallons—for use in storing mild or neutral products. These tanks use the same mildly resistant glass as the UTILITANK, and cost as little as 25c a gallon.

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THE PFAUDLER CO., ROCHESTER 3, N. Y.

Goal—A-1 Canned Fresh Milk

Seeking a sterlizing technique that will retain full flavor of whole milk for canning, Dr. H. E. Gunning, of Illinois Institute of Technology, pours raw milk into tube of new mercury-in-gas resonance irradiator, while Dr. Milton Parker, director of Food Engineering Department, adjusts receiving container. Fan (left) carries off ozone fumes in order to minimize off-flavors. Operations on resonance principle are seen cheaper than nuclear irradiation because no elaborate shielding or generating-unit apparatus are needed. Sterilization (at 40 F.) reduces bacteria count of raw milk to practically zero in mere seconds, with less than 100w. energy input required. But flavor side-effects are still battled.

CD Step by FDA

The FDA Civil Defense Foods Advisory Committee has now been established.

This group will study vulnerability of processing plants to enemy attack, and methods for restoration.

Committee chairman is Roy C. Newton, v.-p. of research, Swift & Co., Chicago, with Frank L. Gunderson, Washington, D. C., technical consultant, as executive secretary.

Other members: John S. Andrews, director of food research, General Mills, Minneapolis; Robert R. Baldwin, laboratory director, General Foods, Hoboken, N. J.; Gail M. Dack, director, Food Research Institute, U. of Chicago; H. C. Diehl, director, Refrigeration Research Foundation, Colorado Springs; Arnold H. Johnson, president, National Dairy Research Laboratories, Oakdale, L. I.; Emil M. Mrak, head, Dept. of Food Technology, U. of California, Davis; and George W. Putnam, v.-p., Creamery Package Mfg., Chicago.

Dessert Mix Addendum

Author of the article, "Dry Frozen Dessert Mix Solves User Problems" (FE Mar., p. 83) was Mr. Elmer F. Glabe, president and director, Food Technology, Inc., Chicago.

This information was inadvertently omitted from the article.—*The Editors*

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This extra strong, superbly concentrated basic powder offers added coloring value to the dehydrated food industry.

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TON-TEX CONVEYOR AND TRANSMISSION BELTING

Briefly . . .

● METHODS IMPROVEMENT Competition, to be run in conjunction with Industrial Management Society's Time & Motion Study & Management Clinic (Chicago, Nov. 9-11), invites entries featuring 16-mm. films of "before" and "after" phases of plant advances. Interested companies should write Society at 35 E. Wacker Dr., Chicago.

● CANNED HAMS and other pork imports from communist Poland ran 3,627,000 lb. in January—up 55% over year previous. And total imports in this category are figured to have reached half the American canned-ham output. So reports American Meat Institute, which accordingly looks on ideas of tariff cuts with the proverbial jaundiced eye.

● GIANT LOBSTERS—deepwater inhabitants—are now being bred to the small, succulent coastal variety in hopes of developing extra-large tasty crustaceans. Joint sponsors of this idea are U. S. Fish & Wildlife Service and the State of Massachusetts.

● MACARONI MAKERS are turning to mixes of softer-wheat flours with their durum due to scarcities of the latter (source of semolina). Trouble is rising toll of black stem rust in durum fields.

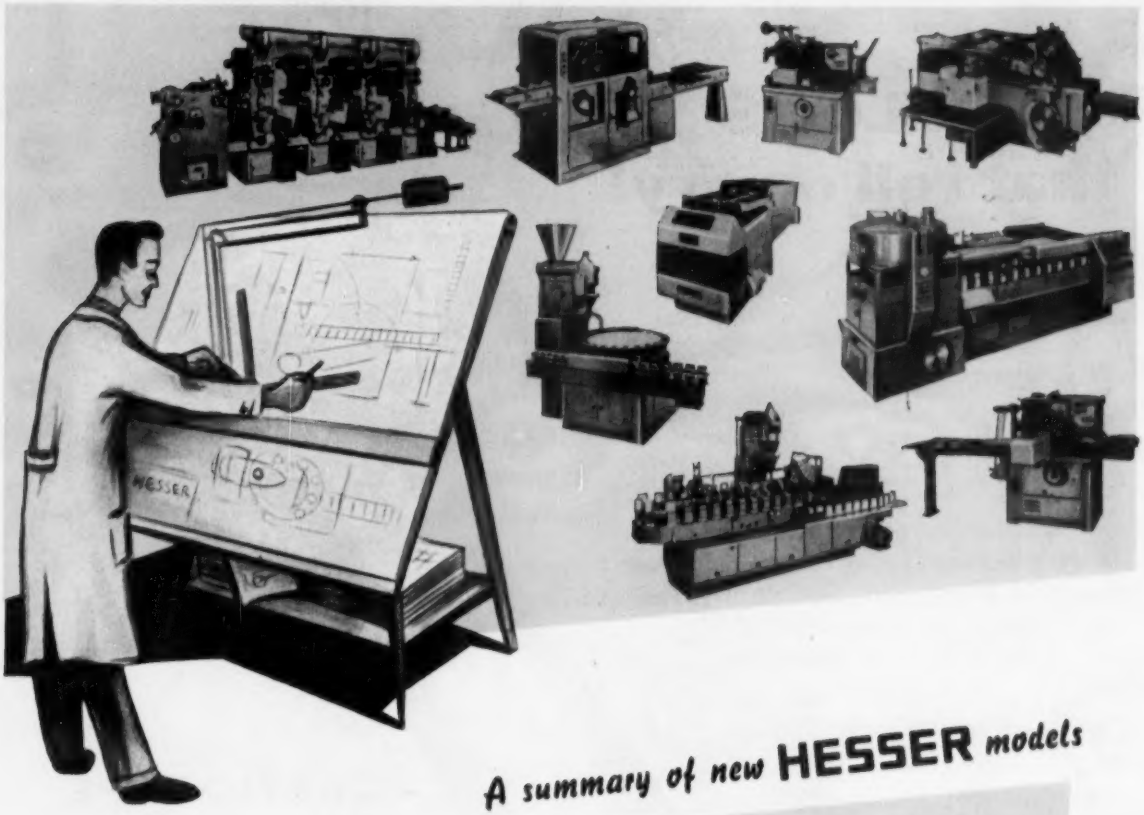
● FOOD TECHNOLOGY Department of MIT reports availability in '55-'56 of a number of fellowships made possible by industrial sponsors for assistance of outstanding grad students. Scholarships are open after first year of residence. A number of part- and full-time research assistantships are also listed.

● MANAGEMENT TECHNIQUES will again be treated in the U. of Iowa's 16th Management Course, scheduled June 13-25. Those interested should address J. Wayne Deegan, 125 Engineering Bldg., U. of Iowa, Iowa City.

● DR. "LARRY" BURTON was recently honored by New York's IFT on occasion of his retirement as executive director of Packaging Institute. A special certificate cited his outstanding contributions to food technology. One of the founders of the national IFT, he also helped establish the New York Section, and further he was editor of *Food Industries*, predecessor of FE. His plans for the future include consulting work.

Lead Frozen-Food Group

Officers for the new year have now been named by the National Assn. of Frozen Food Packers. They are: President, G. L. Mentley, Birds Eye Div. of General Foods, White Plains, N. Y.; 1st V.-P., F. Gilbert Lamb, Lamb-Weston, Inc., Weston, Ore.; 2nd V.-P., S. B. Doughty, Sacramento Freezer, Inc., Sacramento, Calif.; and Secretary, L. S. Martin.



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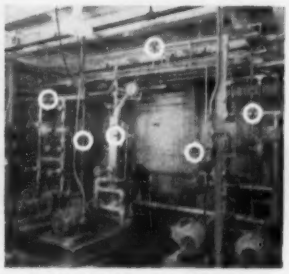

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Cheap Heat-Saver for Retorts

—has been developed by American Meat Institute Foundation, Chicago. It consists of Foamglas insulation coated with a specially developed high-temperature inorganic mastic material, a sample of which is shown here by L. J. Pircon (left), chemical engineer with AMIF. When mastic is brushed on one side of insulation blocks, these blocks will adhere securely to retort shell, the mastic being an adhesive with heat-expansion characteristics suitable for a metal surface. After insulation is applied to retort, it is coated on outside with same mastic to seal pores, this giving a smooth surface with a gray, metallic color. Cost of covering a retort—reportedly cutting steam consumption in half—is only $80. An aluminum sheet covering with insulating air space previously developed by AMIF (FE Sept. 1954, p. 95), is shown in background on retort model. It costs about $200 installed.

Capital Items: Peanuts Up, Poultry Plan, Khapra Ban

Good news for peanut users was in the recent Washington news. Reported, too, was start of the new poultry-checking plan, also institution of a quarantine on the khapra beetle.

Peanuts. President Eisenhower has authorized an additional 51,000,000 lb. of peanuts—to be imported into the U.S. before June 30 to supplement drought-reduced domestic supplies—for use by candy, peanut butter, and other manufacturers.

Current supplies of domestic-produced peanuts in off-farm positions on Jan. 31, was 588,000,000 lb. in contrast to 1,113,000,000 lb. a year ago. This was the lowest figure since 1939.

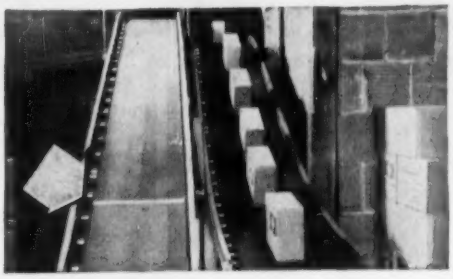
Although peanut candy output has decreased slightly, peanut butter makers have greatly upped output.

With the present annual peanut import only 1,709,000 lb., the Tariff Commission recommended the 50-fold increase for temporary relief.

Poultry. Proposed changes in the USDA voluntary poultry inspection and grading program (FE Jan., p. 197) went into effect Mar. 1. Changes apply to Grades B and C. Grade A is unchanged.

Grade marks are changed slightly to give more prominence to the grade

ALLIGATOR
CONVEYOR BELT LACING



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Schedule of Events

April

12–16—American Warehousemen's Assn., annual meeting; Edgewater Beach Hotel, Chicago.
17–20—American Oil Chemists' Society, annual meeting; Roosevelt Hotel, New Orleans.
18–21—American Management Assn., National Packaging Exposition (International Amphitheater) & Conference; Palmer House, Chicago.
18–24—International Food Show; Kingsbridge Armory, New York City.
19–20—American Dry Milk Institute, annual meeting; Edgewater Beach Hotel, Chicago.
23–27—National Independent Meat Packers Assn., annual meeting & exhibit; Palmer House, Chicago.
24–25—National Pretzel Bakers Institute, spring convention; Bedford Springs Hotel, Bedford Springs, Pa.
24–27—National Fisheries Institute, annual convention; Roosevelt Hotel, New Orleans.
26—National Cheese Institute, annual meeting; La Salle Hotel, Chicago.
28–29—Pennsylvania Manufacturing Confectioners' Assn., annual production conference; Franklin & Marshall College, Lancaster.

May

1–4—Biscuit & Crackers Mfrs. Assn.; Drake Hotel, Chicago.
1–5—American Society of Brewing Chemists, annual meeting; Bellevue-Stratford Hotel, Philadelphia.
8–12—Society of American Bacteriologists, general meeting; Hotel Statler, New York City.
9–13—Assn. of Food & Drug Officials of the U. S.; Hotel St. Charles, New Orleans.
15–19—American Assn. of Cereal Chemists, annual meeting; Chase Hotel, St. Louis.
16–20—National Materials Handling Exposition; International Amphitheater, Chicago.
18–20—Dairy Products Educational Fair; Navy Pier, Chicago.
22–25—Flavoring Extract Mfrs. Assn., annual convention; Edgewater Beach Hotel, Chicago.
22–26—Assn. of Operative Millers; Jefferson Hotel, St. Louis.
23–25—American Management Assn., general management conference; Hotel Roosevelt, New York City.
26—Packaging Institute, conference; Hotel Statler, St. Louis.
31-J3—International Bread Congress; Hamburg, Germany.

designation. Copies of the changes are available from the Poultry Division, Agricultural Marketing Service, USDA, Washington 25, D. C.

Khapra Quarantine. USDA has now placed California, Arizona, and New Mexico under quarantine due to heavy infestation of the khapra beetle (FE Jan., p. 196). Until future notification, grains and grain products moving out of these states will require certification of fumigation from the Chief of Plant Pest Control Branch, Agricultural Research Service, Washington, D. C.

By March, 136 areas of infestation

His job is easier because his truck is cooled with **COLDMOBILE**

With Coldmobile, the driver has no sensitive controls to adjust. No defrosting is necessary. Truck temperature is automatically controlled to stay consistent even after many door openings. Cool air is continuously circulating throughout the truck to keep all meat, poultry or any perishable always fresh . . . constantly protected.

Coldmobile Units Are Truck-Powered for Big Savings Here's real economy! No separate engine or batteries are required for refrigeration. Maintenance for these "extra" units is eliminated, and truck refrigeration becomes the by-product of driving. Yet Coldmobile units operate at peak efficiency with little effect on fuel consumption.

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stabilizing moisture content
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A food product's natural softness and moisture seldom stay put . . . unless you do something about it. Packaging is only part of the answer. Much of softness and moisture control must come from within. And here is where sorbitol can help the foods you make.

Sorbitol not only stabilizes moisture content under varying humidity conditions, but also has a modifying effect on the crystallizing properties or crystal structure of mixed sugar systems. It is these two actions working in conjunction with each other which account for sorbitol's unique value as a conditioning agent for sugar-containing foods.

To your customers, sorbitol enables better retention of original flavor, tenderness, texture and appearance in such foods as shredded coconut, icings, fillings, gelatin products, whips, toppings, doughnut coatings . . . and in cream, nougat, caramel, marshmallow, fudge and centers of coated candies.

To your production men, sorbitol assists in overcoming severe production problems. The softer texture produced by sorbitol helps prevent breakage of some food preparations during manufacture and shipment. Sorbitol provides valuable help in reducing moisture loss in certain sugar-containing foods which are left in starch molds over weekends for Monday finishing.

During our many years of working with food processors, we have found a lot of technical facts on the use of sorbitol which could be useful to you. We'll be glad to explore the possibilities with you, or to send samples and literature. Just write or call Atlas today.

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were found in the three states. Products subject to quarantine include all grains and grain products, dried seeds and seed products of field and vegetable crops, bags and bagging, dried fish, blood, fish meal, and meat scraps. Principal fumigating chemical being used is methyl bromide.

Actions on Standards

Recent developments relative to grade and identity standards include the following (references are to *Federal Register*):

Peas and carrots, frozen, new U. S. Grade Standards issued by AMS, Feb. 17 F. R., p. 1010.

Poultry, poultry products, AMS revision of Grading and Inspection Standards, Feb. 26 F. R., p. 1193.

Soybeans. No changes with respect to class definitions now intended by USDA, though modification had been considered earlier.

Tea, modification of Imports Standards for year May 1, '55 to Apr. 30, '56, Mar. 4 F. R., p. 1344.

Corrections

The waste-reducing mill illustrated in "Food Wastes Made Into Profitable Product" (FE Jan., p. 84) is made by Dano Ingeniroforrentning og Maskingabrik, Copenhagen, Denmark, according to Biochemical Research Laboratory, Spring Valley, N. Y., which developed the application. Mitts & Merrill had incorrectly been cited as manufacturer.

Also, equations given in "Chart Quickly Tells Thermal Conductivity" (FE Feb., p. 94) were erroneously credited to B. C. Sakiadis and J. Coates, who had estimated the experimental error. Original data as well as relevant equations were compiled by L. Rideal.

—*End*—

Safe Packaging Materials

—*Continued from page 59*

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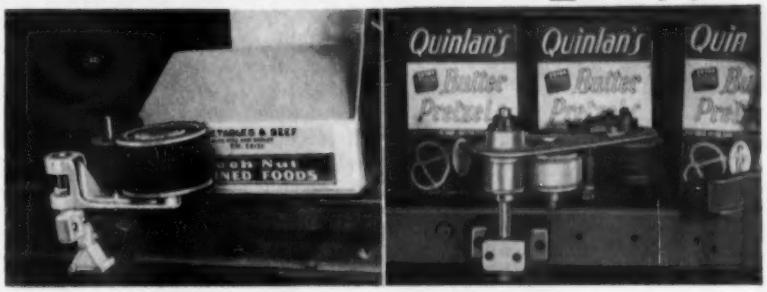
or better. Concentrations below 0.01 ppm. are considered equivalent to "none" in the enforcement of the tolerance section.

There would seem to be some justification, in the spirit if not the letter of the law, for a more liberal—and perhaps even flexible—criterion for determining whether or not a given substance is present in a food.

At any rate, even the most competent and ingenious analysts are sometimes unable to meet the challenge posed by these requirements. Re-

Low-cost marking attachment pays for itself in weeks...saves thousands of $ every year



ROLACODER Marking Machine imprints code-dates, lot numbers, brands, varieties automatically on cases and cartons

Eliminate manual marking of cases and cartons in your plant and save thousands of dollars in labor costs. Attach an inexpensive ROLACODER machine to case-sealer, conveyor or cartoner and let it do the marking job automatically. Compact, precision-made ROLACODER is friction-operated, self-inking—makes a single accurately located imprint on each carton to register with other copy. Uses quick-change rubber type or dies; holds 8-hour ink supply. Different models available for imprinting top, ends, sides of small or large cartons, cases, other packages.

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course must then be had to the use of radioactive tracer studies or to microbiological or enzymatic procedures. If the sensitivity of the method finally evolved is inadequate, the extractibility into foods may sometimes be predicted from tests in which the conditions of exposure are exaggerated with respect to the surface-volume relationship, time, temperature, etc.

Second phase in the safety evaluation involves the application of the analytical method to determining the presence and amount of the additive in the food. It is frequently advisable—because of analytical interferences or because a number of different foods may be involved—to conduct extraction studies with solvent systems simulating the various classes of foods. To this end, the packaging material (such as enamel-coated plate, plastic film, or even a chemical component itself) is exposed to the leaching action of one or more solvents. The latter might be aqueous salt and/or sugar solutions adjusted to different pH levels with sodium carbonate and the food acids (acetic, lactic, or phosphoric).

If the proposed use of the container is to hold a fatty food, representative fats or oils, either alone or as emulsions or mixtures, are used. Leaching is accelerated by storage at elevated temperatures—for example, 55° C. for one month.

The area of contact relative to the volume of extractant may be multiplied to compensate for insufficient sensitivity of the analytical procedure. If the food is to be processed in retorts, the appropriate time and temperature conditions should also be simulated.

Each exposure test, whether of the food itself or in any solvent, should be replicated sufficiently to establish the precision of the test. FDA recommends at least five analyses, five blanks, and five recoveries for each food solvent.

Determining the Hazard

If these studies indicate the probability that the chemical component is extracted by the food, it remains to determine not whether it is detrimental or hazardous to public health in the amounts that might be ingested, but whether the substance is *per se* poisonous or deleterious.

In some cases it is possible to demonstrate, by means of biochemical and metabolic evidence, that a chemical additive to a food is either a normal physiological intermediate or is readily detoxified or excreted through normal metabolic pathways. When this can be accomplished, the need for extensive toxicological tests can be avoided.

Glyceryl monstearate and sorbic acid are examples of additives for which the biochemical approach has been successfully applied. Experience shows, however, that such cases are the exception rather than the rule. Usually it is necessary to conduct the following types of toxicological tests on animals:

1. Acute oral toxicity (LD_{50}) in several species.
2. Ninety-day feeding tests in at least two species, usually rates and dogs.
3. Chronic feeding studies in at least two species, usually two years in rats, one year in dogs.
4. Skin sensitivity tests usually in guinea pigs, preferably in man.

These studies should be designed and conducted to provide observations or data on the following: growth response, food utilization, changes in the cytology or chemistry of the blood and urine, physiological behavior and appearance (activity, laxation, thriftiness, etc.), reproduction and lactation, metabolic fate of the chemical or its reaction products, and finally, mortality rate and post-mortem pathology, both macroscopic and microscopic.

To the uninitiated, this may ap-

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New package keeps Instant STARLAC* free from harmful moisture!

*NONFAT DRY MILK SOLIDS

It has a heat-sealed, moisture-resistant coating of Du Pont ALATHON® polyethylene resin

Material coated by Riegel Paper Corporation, New York, N. Y.

Before placing its new *Instant* "Starlac" nonfat dry milk solids on the market, the Borden Company, working closely with its suppliers, developed an additional package for its nonfat dry milk solids. The texture of new *Instant* "Starlac" would sift through most packages, so precautions were taken along these lines. It was also necessary to take precautions against moisture, because once the moisture content of the powder rose above 3.5%, undesirable lumping would occur.

Several packaging ideas were tried experimentally and found wanting. Then a package consisting of a one-pound board carton with an inside bag was designed. The bag is made from a lamination of two base materials and two coatings of "Alathon" polyethylene resin. The construction of the bag, from the outside to the inside, is as follows: pouch paper, "Alathon," aluminum foil and "Alathon."

The one coating of "Alathon" bonds the paper to the foil. The other coating of "Alathon" of one mil thickness on the inside of the bag permits trouble-free, sift-proof heat sealing. This coating also keeps the super-fine powder in and locks moisture out. In addition, "Alathon" contributes strength and flexibility to the package during the forming operation.

Perhaps the unique properties of coatings of Du Pont "Alathon" will solve *your* packaging problems. For full information, mail the coupon below.

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Which type of package are you interested in?

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- ☐ Single-ply bags
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- ☐ Board trays
- ☐ Fiber drums
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- ☐ Fiberboard containers

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The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.

pear to be a formidable program of study. Yet it confronts every food, chemical, or packaging manufacturer responsible for the introduction of new chemical additives into packaged food products.

Industry Alerted

That the packaging field is alerted to the problem is indicated by the conference on Jan. 12 sponsored by the Packaging Institute, devoted especially to the Evaluation of Safety of Packaging Materials. This conference was prompted by a preliminary meeting last November of a group of technical representatives of the industry at the invitation of The Food Protection Committee's Sub-Committee on Food Technology.

The latter commitee has been conducting a survey of the food industries with a view toward collecting first-hand factual information as to the identity of the intentional chemical additives actually used in foods and quantities involved in such uses.

It is hoped that authentic information along these lines will establish the functional and technological justification for these additives. Then it will relieve the doubts and uncertainties planted in the minds of the public by what Dr. LaVerne Clifcorn calls "blood-thirsty pen-pushers."

You who are concerned with this question are urged to read the publications of Dr. Arnold J. Lehman and his associates in the *Quarterly Bulletin of the Association of Food and Drug Officials* and in the *Food Drug Cosmetic Law Journal*. Also read the publications of the Food Protection Committee, especially the statement of Nov., 1954.

Cooperation with the Food Protection Committee is important, too. Uncovering and understanding the facts will provide the best protection, not only to the public but to our industry as well.

References

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3. A. J. Lehman and W. I. Patterson, *Modern Packaging*, 28, 115, Jan. 1955.
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6. Food Protection Committee, Food & Nutrition Board, National Research Council, Nov., 1954, statement.

The text of this article is from a paper presented at the Feb. 16 meeting of the New York Section, Institute of Food Technologists, Inc. The table has been added by the author. —The Editors.

End (Resume reading on page 60)

Create Better Cheeses

—Continued from page 83

vacuumized and sealed with metal clips.

Then comes steaming to shrink the plastic against the cheese, followed by packing—24 bags (¼-lb.) to a carton. These are sealed and moved to the cold room.

Vacuum packaging is also employed —and with equally satisfying results— in preparing grated cheese. Here, however, glass jars and metal covers are used. Jars are filled on a semi-automatic Pakking filler (Weigh Right Automatic Scale Co., Joliet, Ill.) and simultaneously vacuumized and closed on a semi-automatic unit (Anchor-Hocking).

The grated cheese is made from Parmesan cheese (imported from Italy) and aged American cheddar. With this high-quality cheese carefully dried to a low moisture contact before grating, and with packaging in a high vacuum, no off-color difficulty has been experienced.

End (Resume reading on page 84)

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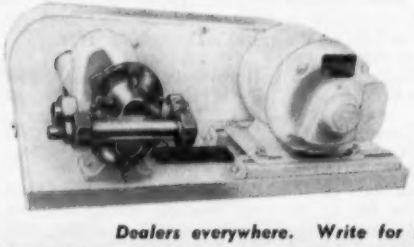

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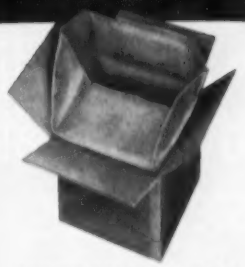

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Fruit or Vegetable Juice in Which Fibrous Tissue and Insoluble Solids are Suspended in Final Product—*C. O. Ball, New Brunswick, N. J., to Chemi-Colloid Laboratories, Inc., N. Y. C. No. 2,696,440. Dec. 7, 1954.*

Dry Imitation Vinegar Comprising Glacial Acetic Acid, Malic Acid, Lactose, Fruit Essence—*C. C. Kmieciak and K. C. Farrel, Chicago. No. 2,696,441. Dec. 7, 1954.*

Edible Ice Cream Cup Having Upper, Lower Sections, Radial Ribs, Upright Fins—*S. C. Graham, Chicago. No. 2,697,041. Dec. 14, 1954.*

Stabilized Product Consisting of Fatty Substrate Plus 0.001-1.0% of 2.2' 5,5'-Tetra Hydroxy-4,4' Ditertiary Butylbiphenyl—*A. Bell and M. B. Knowles, Kingsport, Tenn. to Eastman Kodak Co., Rochester, N. Y. No. 2,697,111. Dec. 14 ,1954.*

PROCESSES

Molding Boneless Meat by Forcing Piece into Container Through Funnel-Shaped Member with Air Pressure—*N. J. Allbright, Hinsdale to Allbright-Nell Co., Chicago. No. 2,696,442. Dec. 7, 1954.*

Flattening Tips Left by Depositing Marshmallow Toppings on Edible Articles by Engaging Pressing Member Refrigerated to Prevent Sticking—*E. T. Oakes, Douglaston to E. C. Oakes Corp., Islip, New York. No. 2,696,793. Dec. 14, 1954.*

Refining Raw Sugar Solutions by Liming Juice to Alkalinity of 0.01-0.05% CaO, Carbonating, Filtering—*A. V. Brieghel-Muller, Gentofte, Denmark. No. 2,697,049. Dec. 14, 1954.*

Rendering Fat From Cellular Fatty Tissues by Comminuting to 1-1 in., Heating to 140 F. Mechanically Pulping, Separating—*A. J. Kramer, Arlington, Va., No. 2,697,112. Dec. 14, 1954.*

Treating Animal Carcasses by Applying to Freshly-Skinned Surface, Plastic-Coated Material Having Vapor Transmission Rate of 15-70 g. Moisture per 100 sq. in. per 24 hr.—*P. A. Goeser, Chicago and C. L. Lohner, LaGrange to Swift & Co., Chicago. No. 2,697,664. Dec. 21, 1954.*

Removing Protein from Fatty Tissue by Rendering Fat, Adding Water at Temperature Above Fat's Melting Point, Settling, Removing Floating Fat, Recovering Water—*A. J. Kramer, Arlington, Va. No. 2,697,113. Dec. 14, 1954.*

Dehyrating Foods by Freezing Moisture on Outer Surface of Rotating Refrigerated Drum, Separating—*N. W. Desrosier, West Lafayette to Food Research & Development, Inc., Lafayette, Ind. No. 2,697,463. Dec. 21, 1954.*

Moving Cans along Helical Trackway for End-Over-End Rotation During Processing—*A. M. Olson, Wauwatosa to Chain Belt Co., Milwaukee, Wis. No. 2,697,665. Dec. 21, 1954.*

Recovering Aconitic Acid From Molasses Solution by Successive Treating Stages in Ion Exchanger While Maintaining pH at 4-6—*D. W. Collier, Philadelphia to Sharples Corp. No. 2,697,724. Dec. 21, 1954.*

EQUIPMENT

Metal Industrial Pallet with U-Shaped Section Comprising Spaced Deck Slats and Beams, Runners, Legs—*E. J. DeRidder and P. E. Brandt, Louisville, Ky. to Reynolds Metals Co., Richmond, Va. No. 2,692,107. Oct. 19, 1954.*

Material Blender With Vertical, Rotating Spindle, Disk With Circumferentially Spaced Openings, Deflecting Hoods—*L. J. Conn, Warren, Pa. No. 2,692,127. Oct. 19, 1954.*

Electric Can Opener Having Supports, Opening Device, Motor, Can-Operated Switch, Automatic Brake Means—*R. W. and S. A. Newsom, Alpine, Tex. No. 2,692,426. Oct. 26, 1954.*

Automatic Liquid Sampler Comprising Means for Connecting Flow Line With Sample-Receiving Reservoir—*F. H. Warren, Findlay, Ohio. No. 2,692,502. Oct. 26, 1954.*

Carcass Splitting Saw With Housing, Laterally Extended Rigid Yoke, Spaced Pivots, Saw Blade, Guide, Power Means—*E. C. Steiner, Los Angeles, Calif. No. 2,692,621. Oct. 26, 1954.*

Hydraulically Operated Food Dicer Having Feed, Control, Power Means—*R. I. Gardner to J. W. O'Brien, Los Angeles, Calif. No. 2,692,629. Oct. 26, 1954.*

Dough Pressure Board for Molding Machine Having Platform, Thick Sponge-Rubber Pad, Rolling Belt, Drive Means—*S. F. Hansen, Pittsburgh, Pa. No. 2,693,771. Nov. 9, 1954.*

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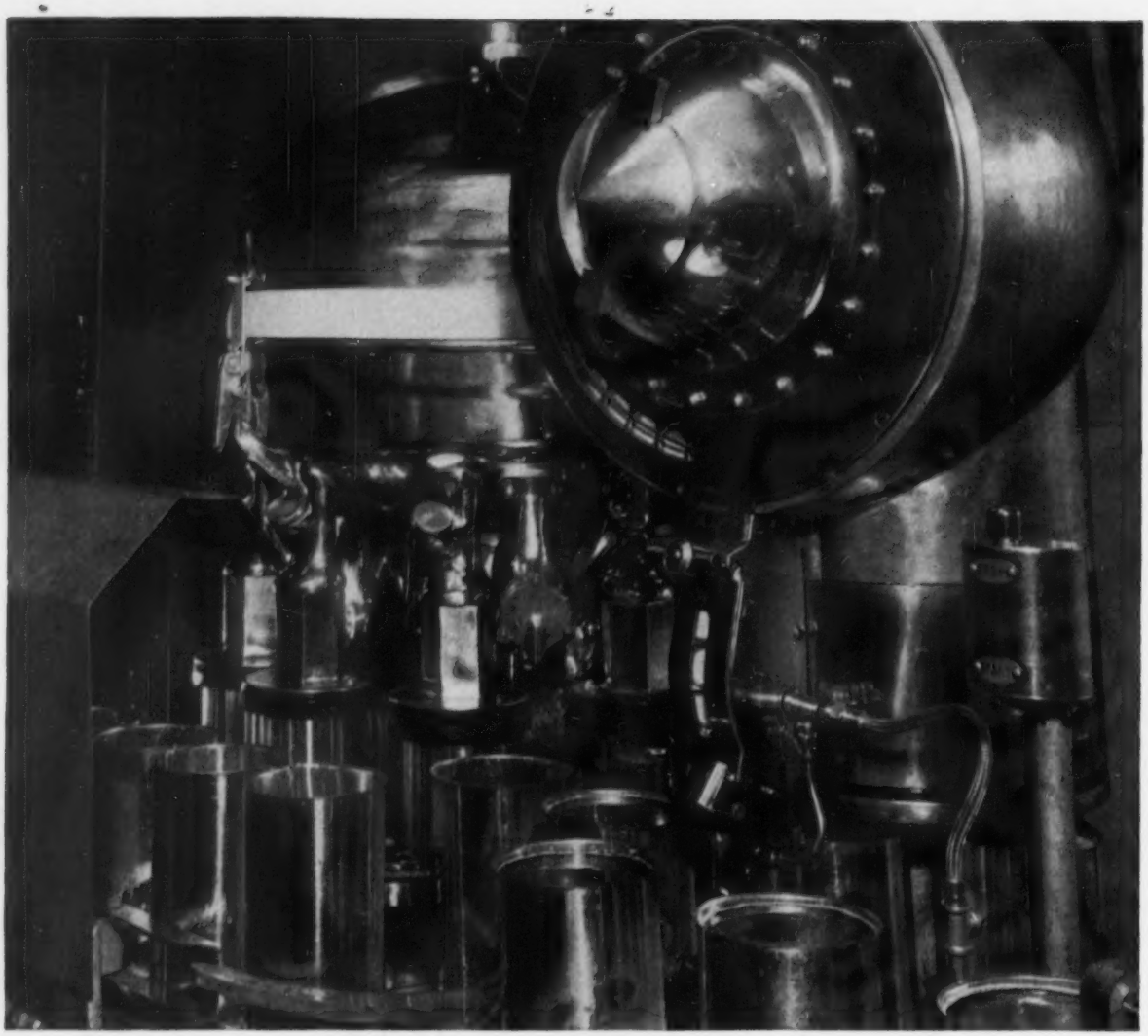

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Gas-Free Liquid Dispenser Comprising Reservoir, Gravity-Fed Pump, Vapor Trap, Discharge Conduit, Automatic Cutoff Valve —*F. G. Hunzley, Bayside, N.Y. to Neptune Meter Co. No. 2,693,196. Nov. 2, 1954.*

Fruit and Vegetable Corer, Segmenter and Slicer—*G. W. Gastafson, Joliet, Ill. No. 2,693,210. Nov. 2, 1954.*

Fruit Orientation Device Having Carrier With Plurality of Spaced Bars, Bottom Plate, Rotating Means—*H. E. Metcalf, Los Angeles to S & W Fine Foods, San Francisco. No. 2,693,267. Nov. 2, 1954.*

Liquid Sampler Comprising Reservoir, Two Pipes With Attached Tubes, Means for Withdrawing, Returning Samples—*J. A. Casler, Royal Oak, Mich., H. O. Smith, L. F. Colman, and M. Levenson, Chicago to USA. No. 2,693,705. Nov. 9, 1954.*

Cherry Declusterer and Destemmer Comprising Rotating Hollow Perforated Drum, Plurality of Inwardly Extending Arms, Brush, Feed Means—*J. Srova, San Jose, Calif. No. 2,693,834. Nov. 9, 1954.*

Refrigerated Meat Chopper Having Removable Casing Section—*A. W. Lundell, Byram to Globe Slicing Machine Co., Stamford, Conn. No. 2,693,835. Nov. 9, 1954.*

Fish-Treating Apparatus Comprising Tubular Holders, Gear Element, Magnetically Controlled Engaging Lever, Wave-Transmitting, Receiving Means—*R. Baader and R. Fahrig, to Nordischer Maschinenbau Rudolf Baader, Lubeck, Germany. No. 2,693,872. Nov. 9, 1954.*

Screw Conveyor With Casing Enclosing Axial Core Having Helicoid Convolutions, Cylindrical Spiral Shell, Trough Portion, Driving Means—*W. S. Martin, Massapequa, N.Y. No. 2,693,873. Nov. 9, 1954.*

Centrifugal Grain Cleaner Having Open-Top Housing, Shaft, Truncated Upwardly Flaring Cleaning Element, Downwardly Ranging Conduit, Fan—*N. T. Ostman, Denver, Colo. No. 2,693,876. Nov. 9, 1954.*

Pallet Feeder Comprising Upright Frame, Rotatable Parallel Members, Sprockets—*R. C. Epperson, Ponca City, Okla. No. 2,693,898. Nov. 9, 1954.*

Olive Packer With Rotating Table, Reciprocating Arm Having Article-Gripping, Depositing Means —*F. W. Olson, Montclair and E. F. Baerenrodt, Essex Fells, N.J. No. 2,693,901. Nov. 9, 1954.*

Solenoid-Operated Valve Comprising Resilient First, Second Valve Seats, Deformable Integral Collar Defining a Fluid Port, Movable Closure Unit—*C. W. Hart, Alhambra, Calif. No. 2,693,929. Nov. 9, 1954.*

Shrimp Deveiner Having Inclined Trough, Water Supply, Knives Spaced Above and Oppositely Inclined Along Trough—*F. S. and J. M. Lapeyre, New Orleans to Peelers Co., Houma, La. No. 2,694,218. Nov. 16, 1954.*

Poultry Tendon Puller With First, Second Fork-Like Leg Engaging and Clamping Devices, Jaws, Slide, Guide and Stop Means—*L. J. Mayer, Frazee, Minn. No. 2,694,219. Nov. 16, 1954.*

Fowl Picker Head-Holding Means Comprising Pair of Vertically Extending, Laterally Spaced Apart Parallel Members Defining Vertical Passageway—*A. W. Sharp to Barker Poultry Equipment Co., Ottumwa, Iowa. No. 2,694,220. Nov. 16, 1954.*

Extruder for Molding Meat Into Flat Ribbon-Like Sheet Consisting of Housing, Feed and Delivery Chamber, Heating Means—*W. F. Spang, Medfield to Needham Mfg. Co., Needham Heights, Mass. No. 2,694,222. Nov. 16, 1954.*

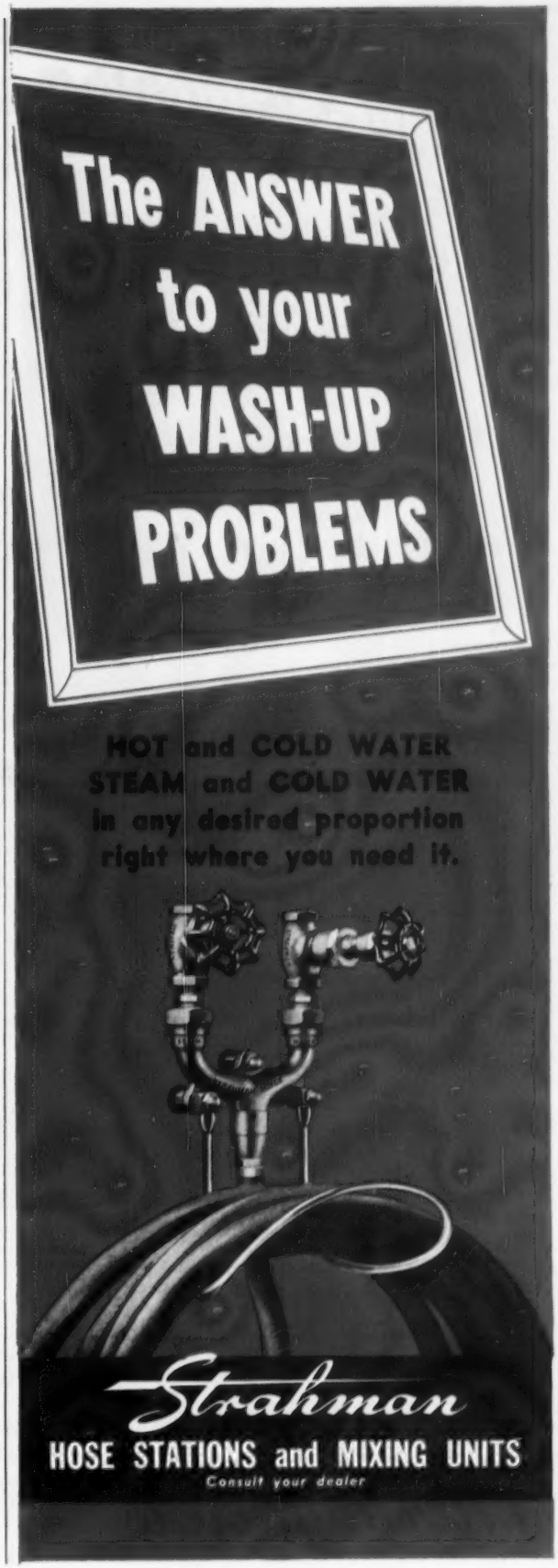
Liquid Metering System for Container Cleansing Machine Having Conveyor, Discharge Nozzle, Solenoid Valve, Electrical Control Circuit—*R. W. and W. T. Phillips, River Falls, and N. J. Schaack, Prescott, Wis. No. 2,694,402. Nov. 16, 1954.*

Wet-Type Air Cleaner With Air Inlet Leading to Lower Liquid Reservoir, Centrally Apertured Annular Baffle, Wall, Removable Filter Element—*W. W. Lowther to Donaldson Co., Inc., St. Paul, Minn. No. 2,694,465. Nov. 16, 1954.*

Device for Lowering Sacked Potatoes Discharged from Grader Comprising Horizontal Closed Pipe Member With Two Connecting, Coplaner Pairs of Laterally-Spaced Pipes, Platforms, Cables, Hydraulic Elevating Means —*F. J. Tupa, Minto, N. D. No. 2,694,467. Nov. 16, 1954.*

Vegetable Dewatering and Cleaning Machine Comprising Plurality of Downward Stepwise Plates, Screen, Vibrating Means—*E. O. Burling and H. O. Nelson, Toppenish, Wash. to California Packing Corp., San Francisco. No. 2,694,489. Nov. 16, 1954.*

Valve-Controlled Hopper Having Spaced Discharge Openings, Movable Bulk Feed Gate, Dribble Feed Mechanism—*H. V. Kindseth to Bemis Bro. Bag Co., Minneapolis. No. 2,694,510. Nov. 16, 1954.*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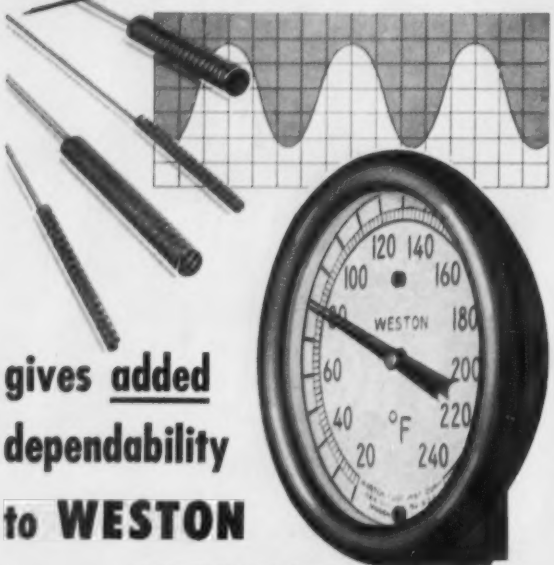

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Poultry Plucker Having Pivotally Mounted Elongated Member With Rod-Receiving Bearing, Finger-Receiving Hole—*G. W. Johnson, Raytown to Gordon Johnson Equipment Co. Kansas City, Mo. No. 2,694,829. Nov. 23, 1954.*

Deep-Bin Grain Probe Having Separable Rigid-Walled Tubular Sections With Internal Chambers, Stationary Rigid Extension, Flexible Connection—*R. G. Handley, Columbus, Ohio. No. 2,694,931. Nov. 23, 1954.*

Machine for Cutting and Suspending Long Bundles of Threads of Dough on One or More Parallel Bars—*M. and G. Braibanti, Milan, Italy. No. 2,694,986. Nov. 23, 1954.*

Filled-Pastry Stamping and Sealing Die Having Inverted Cup-Shaped Body, Peripheral Cutting Edge, An Upwardly Projecting Hollow Conical Handle, Pressing Means—*M. Kappler, Uebersee, Germany. No. 2,694,987. Nov. 23, 1954.*

Drum Handling Hand Truck Comprising Horizontal Side Rails, Cradle, Wheels, Rigid Cross-Member—*R. S. Pringle, Jr., Bradford, Pa. No. 2,695,109. Nov. 23, 1954.*

Sanitary Valve Having Casing, Wall With Flexible Annular Portion, Inwardly Projecting Valve Head, Seat—*B. B. Ivanek, N. Y. C. No. 2,695,156. Nov. 23, 1954.*

Gizzard Splitting and Cleaning Machine Having Conveyor, Engaging and Piercing Means, Knife, Grid, Spray Head—*W. J. Patterson, LaGrange and J. Weissenstein, Chicago to Swift & Co., Chicago. No. 2,695,418. Nov. 30, 1954.*

Apparatus for Heat-Treating Foods in Sealed Containers Comprising Enclosure With Thermal Fluid, Parallel Vertical Guide Tracks, Continuously Driven Chains, Pushing Member, Tubular Baskets, Inlet-Outlet Means—*P. Carvello, Paris, France. No. 2,695,555. Nov. 30, 1954.*

Doughnut-Making Machine Having Column With Rotary Sleeve, Bed Plate With Plurality of Holes, Pivotally-Supported Arms, Shaping, Cutting, Guide Means—*M. Helland, Los Angeles. No. 2,695,570. Nov. 30, 1954.*

Dough Molder Comprising Feed, Molding Rolls, Inclined Knife, Triangular Bar, Adjusting Means, Conveyor—*A. C. Kalmeijer, to N. V. Haagsche Bakkerijmachinefabriek Arnold Kalmeijer, The Hague, Netherlands. No. 2,695,571. Nov. 30, 1954.*

Dough Cooler With Central and Spaced End Compartments, Integral Metal Sheet Linig, Hinged Cover Forming Dough-Rolling Surface, Cooling Means—*C. J. Jeffers, Chadron, Neb. No. 2,695,573. Nov. 30, 1954.*

Food Coating and Handling Apparatus Comprising Pair of Endless Conveyors, Guide Means, Article-Impaling Pegs, Hooks, Cross-Bar—*R. A. Zuercher, Park Ridge, Ill. No. 2,695,590. Nov. 30, 1954.*

Nutcracker Having Anvil, Reciprocating Shaft, Clamping Jaw, Pivotally Mounted Lever Clutch Engaging Means—*S. M. White, Fort Wayne, Ind. No. 2,695,642. Nov. 30, 1954.*

Temperature-Recording Apparatus for Pasteurizer Through Which Liquid Containers are Conveyed, Comprising Overhead Track, Tractor Member, Thermocouple Electrically Connected with Temperature-Time Recorder, Means to Support Thermocouple in Container—*W. E. Gretz, Philadelphia. No. 2,696,115. Dec. 7, 1954.*

Food Slicer Consisting of Conveyor Carrying Transverse Rows of Funnel-Shaped Article Containers, Stationary Supports, Rotary Cutting Blade—*R. J. Trappey, Lafayette, La. to B. F. Trappey's Sons, Inc. No. 2,696,234. Dec. 7, 1954.*

Dough Panner With Dispenser, Dough-Dropping Member, Pan-Stopping Mechanism Comprising Pivotally-Mounted Lever Having Bifurcated Portion, Spring, Finger—*H. C. Rhodes, Portland, Ore. to Read Standard Corp. No. 2,696,334. Dec. 7, 1954.*

Milk-Can Scrubber Comprising Shaft, Clamp, Looped Brush Compressed and Extended by Spring—*H. R. Pendleton, Ft. Worth, Tex. No. 2,696,625. Dec. 14, 1954.*

Hide-Stripper Consisting of Frame, Pair of Hide-Edge Gripping Assemblies, Carcass Bracer, Means for Effecting Relative Movement Therebetween—*W. J. Hincks, Norwood to Canada Packers Ltd., St. Boniface, Manitoba, Canada. No. 2,696,633. Dec. 14, 1954.*

Hop Dryer Comprising Elongated Enclosure, Outer, Inner Endless Conveyors, Product Feed, Heating, Recovery Means—*R. L. Nauman, W. T. Beale, and H. A. Sorensen to State College of Washington, Pullman. No. 2,696,680. Dec. 14, 1954.*

Cranberry Harvester With Frame, Transversely Spaced Parallel Runners, Wheels, Rotating Hollow Drum, Radially Extending Flanges, Actuating Means—*L. C. Getsinger, Wisconsin Rapids, Wis. No. 2,696,706. Dec. 14, 1954.*

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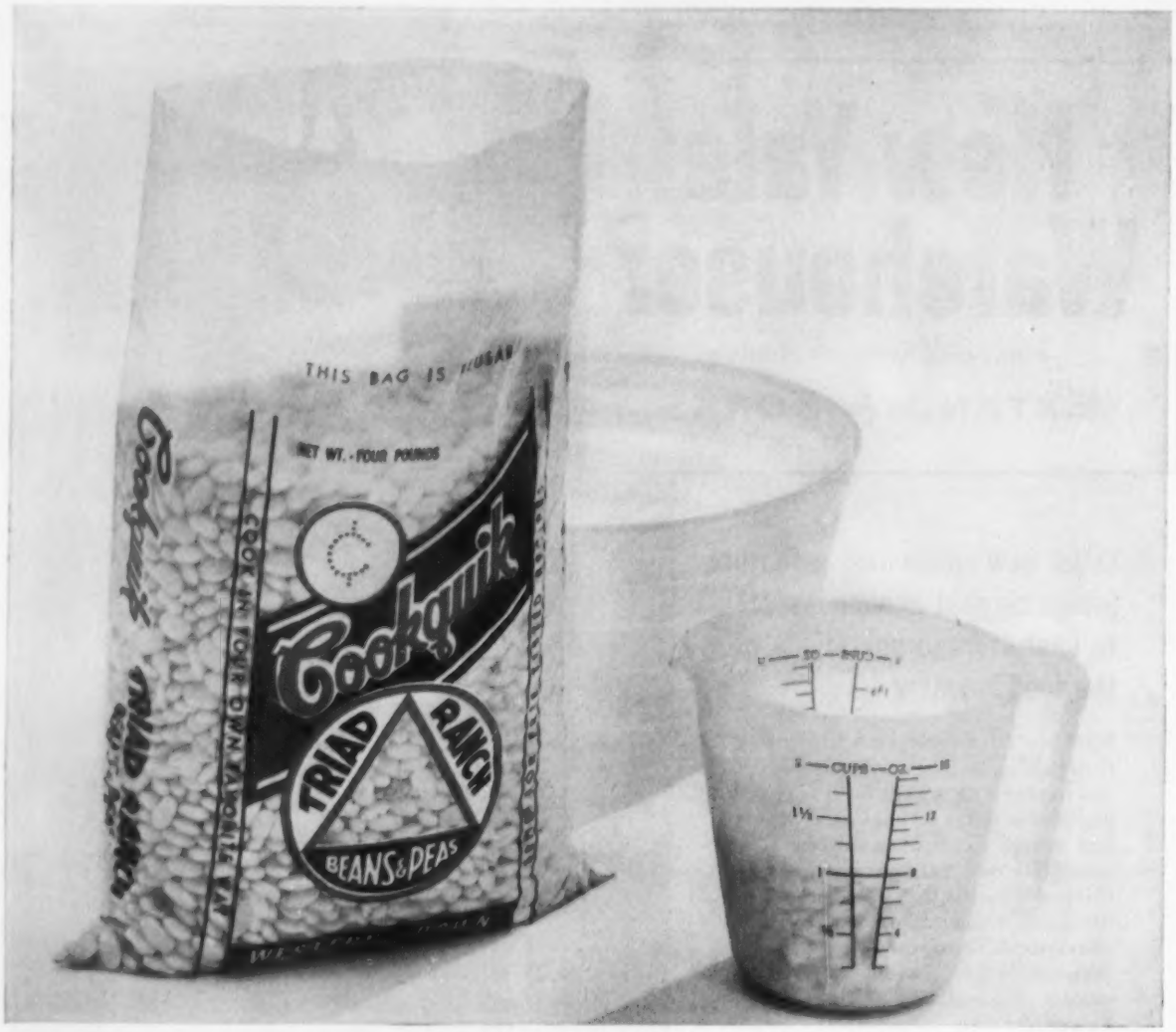

Packaging designed and supplied by **Milprint, Inc.**, Milwaukee, Wisc.

"...creates an impulse to buy"

"The polyethylene bag has *many* advantages." That's the report of Mr. Charles Carbone, one of the top officials of the Trinidad Bean & Elevator Company, Denver, Colorado.

Two years ago the company began looking for the ideal bag for four-pound packages of beans. They wanted it transparent. They wanted it attractively printed. And it had to be strong enough to safely carry four pounds of beans . . . and economical as well.

Bags made of film produced from BAKELITE Brand Polyethylene were the answer. Says Mr. Carbone, "Our increase in the four-pound pack has been constant since we started using the polyethylene bag, and it continues to grow. The bags create an impulse on the part of the housewife to buy. And, when the beans are gone she can and does use the polyethylene bag as a refrigerator container. It works wonderfully."

Whether you market foods, already packaged, or do your own pre-packaging, don't miss out on the extra advantages that are yours when you use packaging made of BAKELITE Polyethylene. See your packaging supplier for the whole story.

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BAKELITE
Polyethylene Plastic

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Can and Case Washer, Having Article-Receiving Tracks, Pivotally Supported Guide Rails, Flow-Control Valve.—*H. D. Lathrop and E. E. Hageline to Lathrop-Paulson Co., Chicago. No. 2,696,822. Dec. 14, 1954.*

Grain-Processing Apparatus Comprising Chamber, Bottom Opening Forming Up-Flow Air Inlet, Downflow Grain Outlet, Abrading and Air-Fanning Means, Baffle Members.—*L. E. Egedal, Milwaukee. No. 2,696,861. Dec. 14, 1954.*

Rotary Filler With Leaves Removable From Casing for Inspection or Repair—*C. L. and C. J. Peterson, Salt Lake City, Utah, and H. M. Hunter, Brooklyn, N. Y. to G. D. Dickey and H. M. Hunter. No. 2,696,916. Dec. 14, 1954.*

Milk-Bottle Carrier With Three Rectangular Wire Loops Arranged One Above Other in Horizontal Plane, Three Sets of U-shaped, Longitudinally Spaced Wire Elements Having Horizontal and Vertical Portions, Set of Laterally Spaced L-Shaped Elements With Horizontal and Vertical Leg Portions, Handle.—*A. D. Malliaris, East Haven, Conn. No. 2,697,540. Dec. 21, 1954.*

Egg Totalizer Comprising Counter, Means Selectively Operable to Differentiate Between Filled and Partially-Filled Cartons.—*R. C. Sneed, Piedmont and C. S. Jordan, Glendale to Safeway Stores, Inc., Oakland. No. 2,697,550. Dec. 21, 1954.*

Fish Filleter Having Frame, Pair of Rotating Circular Knives and Disks, Means for Positioning Fish.—*W. H. Hunt, National City, California, to Fish Machinery Corp., Boston. No. 2,697,849. Dec. 28, 1954.*

Sausage Linker with Casing-Constricting Mechanism Comprising Rotating Disk, Circumferentially Spaced Rectangular Divider Plates, Circular Cam Means.—*L. P. Cross, Valparaiso, Ind. No. 2,697,850. Dec. 28, 1954.*

Food Freezer Comprising Casing, Vertical Stack of Movable Refrigerated Plates, Loading Station, Pressure-Applying Means.—*K. G. Mackenzie, Port Sunlight, England to General Foods Corp., N.Y.C. No. 2,697,920. Dec. 28, 1954.*

Vegetable Cutter Having Movably Supported, Vibrating Horizontal Table, V-Shaped Trough, Pair of Oppositely Directed, Vertically Rotating Knives.—*R. A. Shaw, Watsonville, Calif. No. 2,698,037. Dec. 28, 1954.*

Potato Flotation Tank With Inlet Channel, Water Jet Duct, First Conveyor Along Tank Bottom to Remove Stones, Upper Conveyor to Recover Separated Product.—*D. L. Call and W. I. Tucker, Jr., Ithaca, N. Y. No. 2,698,087. Dec. 28, 1954.*

PACKAGING

Multi-Compartment, Collapsible Shipping Carton, Comprising Hingedly Connected Upright Walls, Foldable Flaps, Partitions—*A. L. Giroux, Jersey City, and S. A. Aquino, Teaneck, N. J. to Hinde & Dauch Paper Co., Sandusky, Ohio. No. 2,693,308. Nov. 2, 1954.*

Automatic Carton Filler With Conveyor, Electrically Controlled Filling, Weighing Stations—*D. O. Johnson and F. A. Johnson, Loleta, Calif. to Foremost Dairies, Oakland. No. 2,693,336. Nov. 2, 1954.*

Sanitary Drinking Attachment for Puncturable End of Beer Can Comprising Flat Semi-Circular Lid with Semi-Annular Lateral Flange, Converging Slits—*R. M. Stafford, Caldwell, N. J. No. 2,693,685. Nov. 9, 1954.*

Container Closure Having Alternating Circumferentially Extending Ribs and Grooves, Molded Elastic Rolling Ring With Angularly Spaced Radial Teeth—*W. Bakker, Arnhem, Netherlands. No. 2,693,978. Nov. 9, 1954.*

Apparatus for Opening Collapsed Cartons Comprising Magazine, Carrier, Rotatably Mounted Pin—*C. J. Malhiot to F. B. Redington Co., Chicago. No. 2,694,350. Nov. 16, 1954.*

Package Consisting of Central, Side Panels, Article-Suspending Tabs, Integral Handle—*W. B. Crane, Jr., Los Angeles. No. 2,694,488. Nov. 16, 1954.*

Device for Applying Covers to Paper Containers Comprising Movable Plunger, Flat Pressure Plate, Applicator-Centering Assembly—*D. Pennestri, Elmont, N. Y. No. 2,694,517. Nov. 16, 1954.*

Want more information on any of these recent patents— If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Cap Feeding and Jar Capping Apparatus Having Tubular Magazine, Plurality of Endless Belts, Co-Planer Guides, Discharge Means—*J. Bowen, Huntington, W. Va., to Alexander H. Kerr & Co., Los Angeles. No. 2,695,125. Nov. 23, 1954.*

Ice Cream Sandwich Package With Open Top, Separable Corrugated Paper Sheet Liner—*F. A. Russell, Charlotte to Russell Corp., N. C. No. 2,695,126. Nov. 23, 1954.*

Carton Opening Tool Comprising Elongated Handle, Flat Guide Plate, Segmental Cutting Blade, Guard Plate, Stop Means—*T. Maynard, Chicago. No. 2,695,447. Nov. 30, 1954.*

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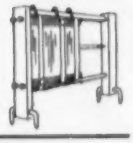

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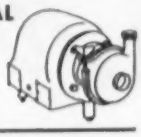
Handle both fluid food products and cleaning solutions



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Engineered refrigeration for cooling, freezing and storage

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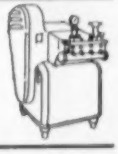
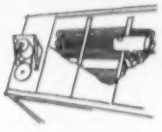
Consistent results with minimum maintenance



☐ **CP CHILLED WATER PRODUCER**

Produces chilled water for cooling



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Heat—cool—mix and store

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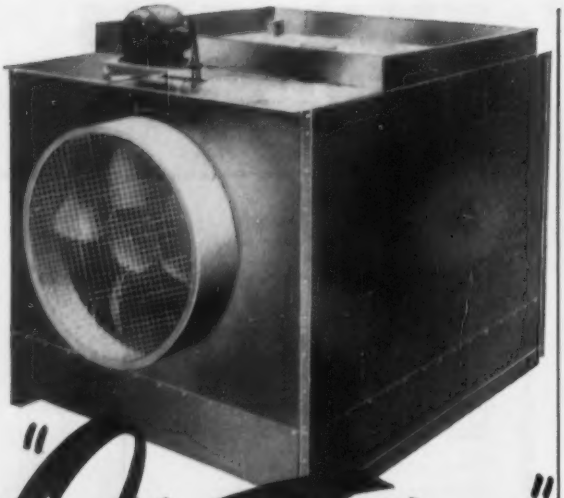
In Canada, mail to:
CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.
267 King Street, W., Toronto 2B, Ontario



"Old Faithful..."

MARLEY AQUATOWER*

In food processing industries, cold water is one thing you can't "take or let alone"! A dependable supply at minimum cost is vital to production and profit. So you find one or several Marley Aquatowers in plants that demand the utmost in water saving for refrigeration and process cooling.

Among food processors, the Aquatower has earned the title "Old Faithful"—the cooling tower you can count on. It delivers the same high level of performance day in, day out, and over the years. That's why Aquatowers far outnumber any other packaged water cooling units in the food field.

Each year the new model Aquatowers set a new standard for high performance and low maintenance. The 1955 line embodies refinements that only Marley specialized engineering can provide. Get the cooling tower story from your Marley engineering sales office (they are in 55 cities) and you'll agree that "nothing cools as well as water—nothing cools water as well as an Aquatower."

*Trademark Reg.

MARLEY The Marley Company
Kansas City, Missouri

Men & Companies

Jervis J. Babb, (right) former president and a director of Lever Bros. Co., has been elected chairman of the board, and **William H. Burkhart** (left) is new president of the firm.

Industry

American Tunaboat Assn., composed of owners of 120 tuna clippers in San Diego, is negotiating for purchase of former **West Coast Packing Co.,** San Diego.

Anacortes Canning Co., Anacortes, Wash., has been purchased by **Nakat Packing Corp.,** Seattle, a subsidiary of **Atlantic & Pacific Tea Co.**

Arden Farms Co. is building a 7,450 sq. ft. addition to its Los Angeles ice cream plant.

Arizona Cheese Cattle Co. has opened a second plant in Yuma. It has 3,200 sq. ft. of floor space.

Birds Eye Foods Ltd. (Canada) has been purchased by Milton Jennings, president of **National Almond Products Corp.,** New York City, and Hugh Paton, president **Paton Corp.,** Toronto.

Calif. Packing Corp. has acquired **Kemp Bros. Packing Co.** plants and other assets at Frankfort and Kempton, Ind.

Consolidated Foods Corp., Chicago has completed negotiations to acquire **E. A. Aaron & Bros., Inc.,** Chicago, and will operate it as a subsidiary.

Dairy Fresh Products Co., Los Angeles, has moved into a new building in Vernon, Calif.

General Bakeries Ltd., Canada, has acquired another company—**Mammy's Ltd.**—in Newfoundland. (Also see FE Mar., p. 210.)

Glen-Del Foods Co. has been incorporated by Horace Delderfied for $50,000. It will manufacture a muffin mix and other foods.

Golden State Potato Chip Co. is building a new factory and headquarters at Long Beach, Calif. It is scheduled for completion June 1.

Great Lakes Sugar Co. has sold its three sugar factories and other assets to **Northern Ohio Sugar Co.**

Gunther Brewing Co. has purchased 1⅛ acres of land in Baltimore for a new shipping and receiving building.

Hawaiian Pineapple Co. has placed orders for $2,500,000 in can-making machinery with: **Hamilton Div., Baldwin-Lima-Hamilton Corp., E. W. Bliss Co.,** Toledo, **Angeles Sanitary Can Machinery Co.,** Los Angeles, **Dewey & Almy Chemical Co.,** Cambridge, Mass. (Also see FE Feb. 6. p 216.)

H. J. Heinz plans a gradual shift of canning operations from Berkeley to Tracy, Calif.

Hostess Ice Cream Co., Detroit, has been purchased by **Fairmont Foods Co.** and merged with the Detroit branch of Fairmont.

John Morrell & Co. is adding a sausage kitchen to its Los Angeles plant.

Langendorf United Bakeries, Inc., has broken ground for a $2.5 million plant, to include offices and warehouse, in Bell Gardens, Calif.

Viva Mikro-D! It Helped Mexico Make More and Better Tortillas!

New World Way

Section of a battery of MIKRO-D PULVERIZERS grinding tortilla flour in a plant in the suburbs of Mexico City.

(Photo by Mary St. Albans)

Old World Way

There's a revolution going on south of the border . . . a peaceful one . . . and we are proud to have supplied the "heavy munitions".

For centuries the corn meal for tortillas, the substitute for bread in our sister republic, was ground in the village mill or by the housewife with her own crude implements. Today it is mass produced in better quality, and Mexican folks are enjoying the obvious benefits of modern food engineering.

One plant alone in the suburbs of Mexico City is turning out a minimum of 600,000 pounds of corn meal per day by a patented process. And every ounce of it is ground and blended in a battery of 19 MIKRO-D PULVERIZERS.

Through meritorious service such as this, the tradename MIKRO-D has come to stand for a better product, in greater volume, at lower cost, not alone in the food field but in the chemical, drug, cosmetic and allied industries.

Why not let our engineers work on your problem? The facilities of our laboratory are yours to command without charge or obligation

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METALS DISINTEGRATING COMPANY, INC.
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TESTS ROUND CANS FROM 2" to 4½" dia.

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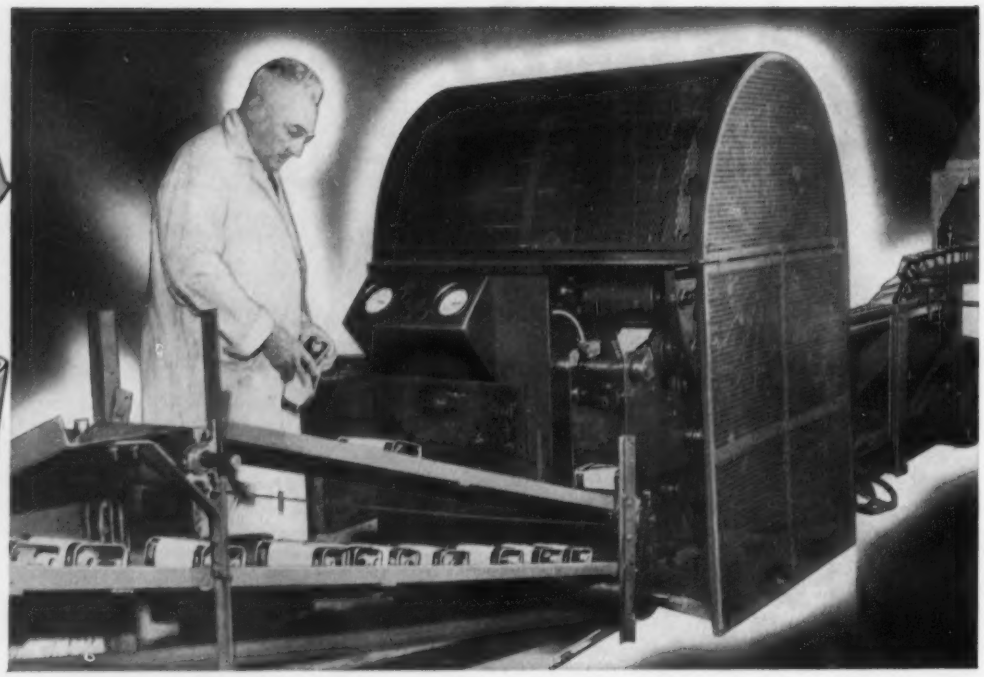

The BLISS 318-- Here's a practical can tester for medium speed production lines

The 18 testing heads of the Bliss 318 handle F-style cans in half-pint, pint and quart sizes at up to a 150-per-minute rate . . . square and rectangular cans up to 100 per minute, including those with handles and spouts.

SIMPLE, FOOLPROOF TEST—As cans feed into the Bliss 318, they're enclosed by one of the 18 air-tight testing buckets. Compressed air is then pumped to the can. Even the slightest pinhole leak in the can will cause air pressure in the bucket to rise. When that happens the can is ejected automatically. It's a simple, thoroughly-dependable way to eliminate "leakers".

COMPLETELY AUTOMATIC—The Bliss 318 Automatic Air Can Tester needs no operator. An electrically-controlled stop-and-start feeding system completely eliminates jams—*automatically*. All cans are tested and passed or rejected—*automatically*. And the simple, rugged construction of the 318 means trouble-free performance, a minimum of maintenance.

COMPACT—Easy to install in your production line, the Bliss 318 only requires a floor space of approximately 5 x 6 feet.

MODERATELY PRICED—The Bliss 318 Can Tester gives you the advantages of many larger testers—at a lower cost! Can you use a Bliss 318 on your line? It's easy to find out. Call in a Bliss Can Machinery Specialist to study your production line set-up and make his recommendations. There's no obligation on your part, of course.

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BLISS on your machine is more than a name... *it's a guarantee*

BLISS CAN AND CONTAINER MAKING MACHINERY

SLITTERS

BODYMAKERS

FLANGERS

SEAMERS

TESTERS

STRIP FEED PRESSES

Mallett & Co., Inc., has purchased **Max Ams Co.** and **National Almond Products Corp.,** both of Brooklyn.

Nestle Co., Inc. has named architects to design a 3-story New York City office building to accommodate 600 people.

Norka Beverage Co. has purchased **General Beverage Co.** of Kent, Ohio.

Proctor & Gamble Co., Cincinnati, will add a $2 million vegetable shortening plant to its Chicago facilities.

Rosita Products Co., Phoenix, Ariz., is constructing a $50,000 addition to its canned and frozen Mexican-foods plant.

Sierra Candy Co. will spend $500,000 to remodel its San Francisco plant and install new equipment.

Smart & Final Iris Co., Los Angeles, has announced that its negotiations toward a merger with **Consolidated Foods Corp.,** Chicago, have ceased. It had been incorrectly reported (FE Mar. p. 210) that the merger had been completed.

Stein, Hall & Co., has purchased **Limestone Starch Co.** of Limestone, Me., through its subsidiary, **Eastern Maine Starch Co., Inc.**

Stokely-Van Camp, Inc. has begun production of frozen orange juice concentrate at a new plant in Haines City, Fla.

Personnel

Austin L. Adams, chairman of Atlantic Coast Fisheries Co., Boston, has been elected to the additional post of president.

Herbert L. Bebar, has been named president of Wallace & Co., Brooklyn candy producing firm.

Glenn B. Cook, manager of Swift & Co.'s Spokane plant since June 1953, recently became assistant manager of the firm's Chicago plant.

William P. Drake has been appointed executive vice-president and also elected to board membership of Pennsylvania Salt Mfg. Co.

John B. Ellena, president of Ellena Brother Winery, is new chairman of the board for the Wine Institute, San Francisco.

Jaxon O. Hice, former head of SeaPak Corp., St. Simons Island, Ga., has been named president and general manager of Shoreline Packing Corp., Tampa, Fla. The latter company's name has been changed to Shoreline Enterprises of America, Inc.

L. J. Fitzpatrick has become general superintendent of Armour & Co.'s Spokane plant.

Irving H. Granicher is new vice-president in charge of marketing for California Packing Corp.

Joseph Harmon has been elected vice-president of Hunt Foods, Inc., Fullerton, Calif. Meanwhile, he will retain his position as secretary and general counsel of the firm.

Ferris F. Kimball has been named a director of Creamery Package Mfg. Co., Chicago.

Dr. Paul J. Kolachov will be resident advisor to the first laboratory center in Colombia, to be set up in Bogota with technical assistance from Armour Research Foundation of Illinois Institute of Technology, Chicago.

John Kowet will be division manager of Canada Dry Ginger Ale, Inc.'s new bottling plant nearing completion at Maspeth, L. I.

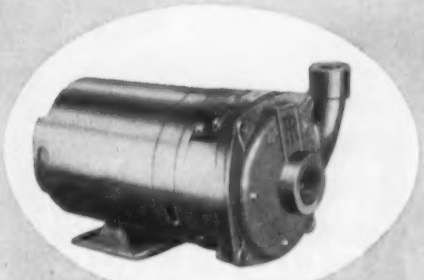
Norman Kraft, retired vice-president of Kraft Foods, has joined Lorraine Co., a consulting firm in St. Louis.

J. R. Lanfear, former manager of Frito Co.'s Houston plant, has been named manager of the firm's Dallas headquarters plant.

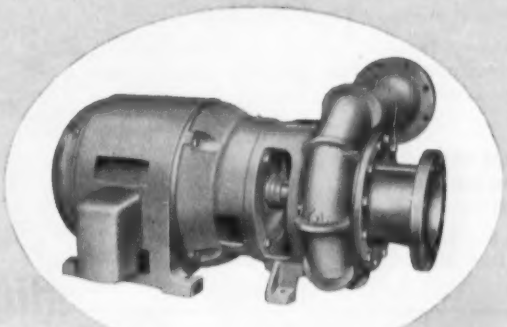
V. I. Maitland has been appointed executive director of advertising and public relations of the Duquesne Brewing Co., Pittsburgh.

Yoshito William Masuoka has joined Kitchen Art Foods,

5GPM or



2800GPM



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BARTELT — NEW
Checkweigher The Bartelt Checkweigher can *save you money* by assuring accurate weights without delaying production. It checkweighs containers at speeds up to 130 per minute, automatically rejecting off-weights to pre-selected weight differentials as accurate as plus or minus 1/60 of an ounce. Trouble-free performance, and low operating and maintenance costs are assured by the simplicity of construction. Let us send you all of the facts.

Write for folder today!

by BARTELT ENGINEERING COMPANY ROCKFORD, ILLINOIS

Don Bowker has been named manager of Calavo Growers of California's new packing house now under construction in Santa Paula, Calif.

Inc., as quality control chemist.

Kyrel Meschter, of The American Preserve Co., Philadelphia, has been elected president of National Preservers Assn.

Charles E. Riley has been elected president of Bes-Tex Foods Corp. of Chicago.

William Rothstein has been appointed director and member of Crescent Nut & Chocolate Co.

Penrose Russell is new president of Hikmott Canning Co., Antioch, Calif. **Larry Huntington** will be secretary-comptroller of the firm.

Vernon G. Sargent has been named secretary of Kraft Foods Co., and **Gordon Edwards** becomes treasurer.

Lou C. Sorensen has been elected to the board of Bell Brand Foods, Ltd., of Los Angeles.

William A. Stephens is now administrative assistant to the president of General Mills, Inc.

Harry Strong has been elected vice-president of City Products Corp., Chicago.

Warren Tingdale has been named assistant to the president of American Home Products Corp.

Kenneth W. Ward has been appointed acting general manager of Western Condensing Co., Petaluma, Calif.

Harry A. Watkins has been elected a director of Minute Maid Corp.

K. Brantley Watson has been chosen vice-president for McCormick & Co., Inc., spice and flavoring extract house.

ASSOCIATED INDUSTRIES

American Can Co. has opened a new plant in Denver.

Armstrong Cork Co. has elected Hobart C. Ramsey to its board.

Automation Engineering Lab announces that Robert White has joined its staff.

Canning Machinery & Supplies Assn. has re-elected all officers for the coming year. E. M. Funkhouser, Jr., continues as president.

Crown Cork & Seal Co., Inc., has elected Harvey Stephens general manager of its Crown & Closure Division.

Gaylord Container Corp. has elevated William Meyer to vice-president-treasurer, and Clair Cullenbine becomes secretary.

W. R. Grace & Co. has purchased 200 acres near Greenville, S. C., for construction of a new plant to manufacture Cryovac plastic bags.

International Paper Co., N. Y., has acquired most of the stock of **A. M. Collins Mfg. Co.,** Philadelphia.

Marathon Corp. has begun food-package manufacturing operations in its recently completed plant in Modesto, Calif.

Milprint, Inc., of Milwaukee has elected Jerome Lieberman, Jr., treasurer.

Owens-Illinois Glass Co. will build a two-furnace glass container manufacturing plant in Portland, Ore.

Deaths

Dwight B. Austin, 56, president of Middle Western Div., Great Atlantic & Pacific Tea Co.—Mar. 7.

Ellsworth E. Dwight, 83, retired vice-president and treasurer of Church & Dwight, Inc., New York City.—Feb. 25.

Edward J. Griesedieck Sr., 59, president Griesedieck Bros. Brewery Co., St. Louis.—Mar. 6.

Bacon-Pac is made to Daniels order for a specific purpose. It has all the necessary market protection plus economy. When Mrs. Housewife buys sliced bacon in a "bacon pak" printed by Daniels she knows she is getting the best bacon value.

We invite Inquiries

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There is a **DANIELS** product to fit your needs, printed in sheets and rolls . . . transparent glassine • snowdrift glassine • superkleer transparent glassine • lard pak • bacon pak • ham pak grease-proof • sylvania cellophane • laminated papers • special "Heat-Seal" papers.

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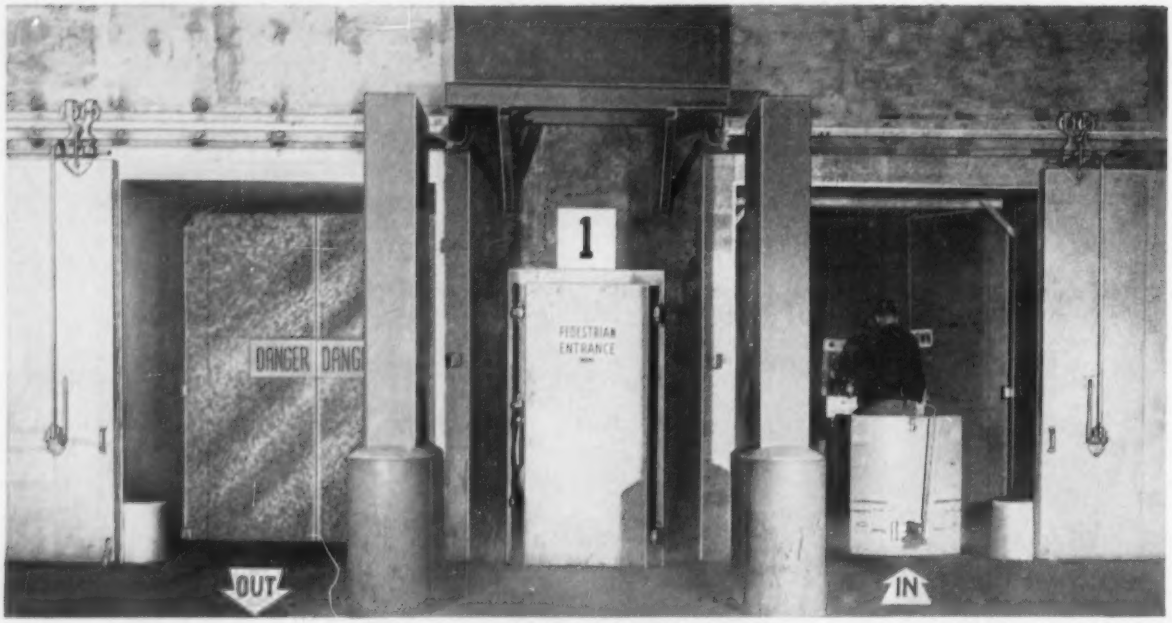
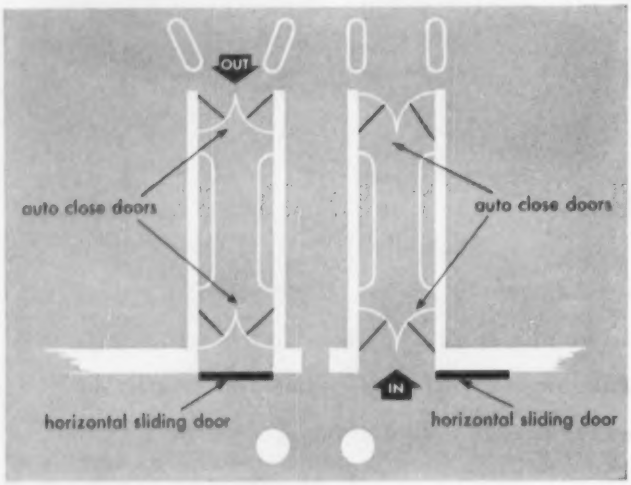


One-way door systems speed handling. Fork lift trucks enter −50° F freezer room at right and leave at left. To prevent interference with materials handling, a Jamison Super Freezer Door is installed in the center for pedestrian traffic.

Freezer Warehouse Uses Jamison Doors in Novel One-Way Traffic System



Vestibule icing problem solved. Two sets of Auto-Close Doors 24 feet apart form a vestibule that acts as an air lock. Ice and frost formation is prevented on doors and floor by a top-floor warming system and by air conditioning the vestibule.

With one-way traffic and dehumidified air locks, the Merchants Terminal Corporation establishes a new high for handling efficiency and refrigeration economy in its new Landover, Maryland, warehouse. Thirty-five Jamison Doors play a large part in this operation. For additional information about cold storage doors, consult your architect or write to JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD.

Architect: Van Rensaler P. Saxe, Baltimore, Md.
Consultant: A. W. Ruff and Luke St. Onge
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Horizontal rotary vacuum filters in sizes 3 ft. to 12 ft. usable for free settling or free filtering applications. Booklet 202. 4 p. —Filtration Engineers, Inc., 155 Oraton St., Newark 4, N. J. (251A).

CO_2 Applications

Uses of carbon dioxide in industry described in *CO_2 Applications Unlimited*.—Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23. (251B).

Controlled Pumps

Discussion of controlled volume pumps which proportion caustic soda to vegetable oil flow, assuring proper break. Data Sheet B-54-1.—Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18. (251C).

Steam, Air Traps

Description of trapping of steam, air, and other gases, includes installation diagrams, charts for determining sizes, advice on specific problems. Catalog 953. 32 p.—W. H. Nicholson & Co., 193 Oregon St., Wilkes-Barre, Pa. (251D).

Steel Filters

Illustrated description of stainless steel filters with adjustable clamp feature. Booklet 1054. 4 p. —W. M. Sprinkman Corp., 4022 N. Port Washington Ave., Milwaukee 12. (251E).

Standard Valves

Description of standard Series 1000 H-D control valve line. Brochure 103-B.—Hammel-Dahl Co., 175 Post Rd., (Warwick) Providence 5, R. I. (251F).

Cold Storage Doors

Information on line of metal-clad cold storage doors.—Jamison Cold Storage Door Co., Hagerstown, Md. (251G).

Vertical, Horizontal Motors

Descriptions and colored illustrations of ½ to 400 hp. vertical motors. Also, ½ to 75 hp. footless horizontal motors. Bulletin 1868. —U. S. Electrical Motors, Inc., Los Angeles. (251H).

Concrete Walls

Folder of data on design and fire-resistance of Vermiculite concrete panel or spandrel walls. 35 p.—Vermiculite Institute, 208 S. La Salle St., Chicago. (251I).

Controlled Flow Pumps

Facts on sanitary controlled flow pumps for use with milk, food, beverages, chemicals, etc. Descriptions, illustrations and specifications. 17 p.—Bump Pump Co., La Crosse, Wis. (251J)

Rotary Pumps

Three catalogs listing sanitary, heavy duty, and general purpose positive-displacement pumps with specifications. Total 72 p.—Viking Pump Co., Cedar Falls, Iowa. (251K)

Cooling Towers

Formula for calculating cost of cooling water, together with data for construction and operation of cooling towers. Catalog 700. 8p.—Acme Industries, Inc., Jackson, Mich. (251L)

Steam Pump

Specifications and capacities for horizontal steam pump. Bulletin 230. 4p.—Warren Steam Pump Co., Inc., Warren, Mass. (251M)

Power Transmission

Four illustrated drive catalogs containing engineering data: V belts WBC-55-2, conveyor pulleys CPC-55-2, shaft-mounted speed reduction SRC-55-2, and flat belt drives FBC-55-2.—American Pulley Co., Philadelphia. (251N)

Water Treatment

Handbook compares demineralizing methods, complete with flow diagrams, illustrations, and chemical results. Publication 5800-B. 40 p.—Cochrane Corp., Philadelphia. (251O)

Cooling Fans

Comprehensive illustrated manual gives engineering data and lists fan equipment. Catalog 20-B. 64 p.—Aerovent Fan Co., Inc., Piqua, Ohio. (251P)

Filter Fabrics

Background material for selection of proper filter cloths. 17 p. —Wellington Sears Co., 65 Worth St., New York City. (251Q)

Counter Operates Switches

For packaging and light production machines, a pre-set, electrical counter will open or close switches. Illustration and specifications. Bulletin 56. 1 p.—Durant Mfg. Co., 1907 N. Buffum St., Milwaukee. (251R)

Boiler Pumps

Information on 2-stage, regenerative, turbine type, boiler feed pumps operating up to 300 lb. psi. Bulletin 107. 12 p.—Roy E. Roth Co., Rock Island, Ill. (251S)

Steel Tubing

Details on mechanical, stainless, and structural tubing with fabricating data. 30 p.—Ryerson Tubing Service, New City Hall Bldg., Rockford, Ill. (251T)

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Wide range of uses detailed with illustrations and dimensions for portable heating cable. 7 p.—Continental Electric Equip. Co., Cincinnati. (251U)

Jumbo Mixers

Information on 600-3,850-gal.-capacity, agitator-type mixers. Bulletin 800.—J. H. Day Co., 1146 Harrison Ave., Cincinnati. (251V)

Line of Motors

Specification list of ½ to 5 hp. motors available.—Leland Electric Co., Dayton 1, Ohio. (251W)

End-Suction Pumps

Performance ratings and design characteristics of end-suction centrifugal pumps. Bulletin 4011.—Deming Co., 556 Broadway, Salem, Ohio. (251X)

Sanitary Pumps

Corrosion resistance and sanitary advantages of positive displacement pumps related in bulletin.—Waukesha Foundry Co., Waukesha, Wis. (251Y)

Smoke Controller

Two models of controllers that warn of excessive smoke from furnaces described.—De-tec-tronic Corp., Chicago. (251Z)

Micro Pump

Operating data on piston-diaphragm, micro-flow pump delivering from 0 to 694 oz. per hr. at pressures up to 1,000 psig. Bulletin 500. 3 p.—Lapp Insulator Co., Inc., Process Equip. Div., LeRoy, N. Y. (251AA)

Coolant-Feed Control

Catalog available on remote feed valves for controlling feed of ammonia or Freon coolants.—H. A. Phillips & Co., 3255 W. Carroll Ave., Chicago. (251AB)

Freezer Systems

Information on sharp freeze, cooling, ventilating, and heating systems.—King Co., Owatonna, Minn. (251AC)

Resistant Insulation

Installation and finishing facts on insulation that is proof against water, fire, rot, and vermin.—Pittsburgh Corning Corp., Pittsburgh. (251AD)

Valve Line

Special flow-control problems are considered in catalogs on general line of valves in bronze, steel, iron, and special alloy metals.—Wm. Powell Co., Cincinnati. (251AE)

Stainless Steel

Bound reference handbook gives properties, analyses, and guidance in specifying grades of steel for fabricating purposes.—Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh. (251AF).

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Illustrated catalog details slow speed, normal, and closed motor drives. Catalog 201. 20 p.—Sterling Electric Motors, Chicago. (251AG)

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Bronze Valve

Tough bronze valves with wear-resisting alloy seats and disks described and pictured with specifications and features.—Lunkenheimer Co., Cincinnati. (251AL)

Compressors

How to select right size and type compressor, plus pointers on maintenance and applications of compressed air.—Gardener-Denver Co., Quincy, Ill. (251AM)

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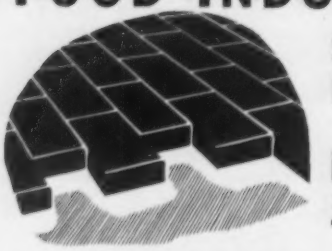

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Information, including installation details, on anti-noise, even-lighting ceilings. 16 p.—Luminous Ceilings, Inc., 2500 W. North Ave., Chicago. (252A).

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Line of hot-water boilers, using internally-finned tubes, is pictured. Bulletin 542.—Brown Fintube Co., Elyria, Ohio. (252B).

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Colored chart of filler metals for welding keyed by use.—Arcos Corp., 1500 S. 50th St., Philadelphia 43. (252C).

Compressed Air Data

Information on compressed air and how it can improve production efficiency in the plant with special attention given to filtration, regulation, and lubrication.—C. A. Norgren Co., 3400 S. Elati St., Englewood, Colo. (252D).

Spring Lock Washers

Booklet, "Spring Lock Washers —Their Engineering Principles", available.—Herbert Blake, Jr., Spring Washer Institute, 74 Trinity Pl., New York City 6. (252E).

Socket Screws

Features, manufacturing methods, and applications of full line of socket screws. Bulletins 898, 899.—Bristol Co., Waterbury 20, Conn. (252F).

Worm Gear Sets

Available in standard ratios from 4½ to 71, worm gear sets are applicable in cranes, hoists, machine tools, and furnace drives. Manual SW 1. 24 p.—Foote Bros. Gear & Machine Corp., 4545 S. Western Ave., Chicago 9. (252G).

Vacuum Cleaning

Features of a non-electrical, syphon jet, vacuum cleaning system explained with illustrations. Bulletin 50, 4 p.—Wilson Engineering Corp., 122 S. Michigan Ave., Chicago. (252H).

Sanitary Fittings

Reference chart, for notebook or wall, pictures complete line of sanitary fittings with catalog numbers.—G & H Products Corp., Kenosha, Wis. (252I).

Plastic Tubing

Information and technical details on clear, portable, plastic tubing. Bulletin T-87.—U. S. Stoneware Co., Plastics Div., Akron, Ohio. (252J).

Oil Filter

Permanent bronze oil filter for use on cars or trucks explained and diagrammed, with sizes and costs. —Engine Products Mfg. Co., 5801 E. Beverly Blvd., Los Angeles. (252K).

Weld-Type Fittings

Complete facts, engineering data, and price list on recessed and butt-type stainless steel fittings for welded lines, contained in 12-p. illustrated folder.—G & H Products Corp., Kenosha, Wis. (252L).

Floor Repairs

Folder illustrates applications of floor patching compound.—Stonhard Co., 1306 Spring Garden St., Philadelphia. (252M).

Magnetic Pulley

Automatic removal of tramp iron by non-electric, permanent magnet belt pulleys described, with listing of available sizes. Bulletin PY-260, 8 p.—Homer Mfg. Co., Inc., Lima, Ohio (252N).

Spray Nozzles

Narrow or wide-cone spray nozzles described. Bulletins 6A and 6C.—Monarch Mfg. Works, Inc., 2517 E. Ontario St., Philadelphia. (252O).

Spray Systems

Reference manual gives data on standard and special spray systems. Catalog 24.—Spraying Systems Co., 3212 Randolph St., Bellwood, Ohio. (252P)

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Number of lubricants needed in plant is reported cut by use of multi-purpose products described in new literature.—Pure Oil Co., 35 E. Wacker Dr., Chicago. (252Q).

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Line of bulk wire cloth, also special fabrications made from customer's blueprints. 80 p.—Cambridge Wire Cloth Co., Cambridge 3, Md. (252R).

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Description of portable-stacking, floor-to-floor, horizontal belt, gravity roller, and gravity wheel conveyors.—*Samuel Olson Mfg. Co., Inc., 2425 Bloomingdale Ave., Chicago 47.* (255B).

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Milk Truck

Details of farm pick-up tank with pictorial layout and specifications. Bulletin MT-55200, 4 p.—*Heil Co., Tank Sales Div., Milwaukee.* (255D).

Crate Loader

Illustrated operation of automatic, magnetic, retort-crate loader and unloader. 4 p.—*W. F. & John Barnes Co., Process Equipment Div., Rockford, Ill.* (255E).

Bulk Bins

Easily assembled bulk bins with heavy duty shelves and steel corner locks. Product Sheet BB-114. 4 p.—*Sturdi Bilt Steel Products, Inc., 2501 Peterson Ave., Chicago 45.* (255F).

Sugar Handling

Dry sugar movement in bulk by trucks, railroad cars, and portable bins described. Subject covered in comprehensive manual.—*Lamborn & Co., Inc., 99 Wall St., New York City.* (255G).

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Food Freezer

Description with illustrations of double-contact pressure plate freezers, designed for ammonia, brine or freon refrigerant.—*Amerio Contact Plate Freezers, Inc., Union City, N. J.* (255K).

Rust-Resistant Kettles

Corrosion resistant, jacketed kettles for canning and food processing described. Bulletin 1. 8 p.—*Lee Metal Products Co., Inc., Philisburg, Pa.* (255L).

Jar Cleaner

Description of jar cleaning line to handle wide-mouth jars or cans.—*Chisholm-Ryder Co., Hanover, Pa.* (255M).

Tanks and Kettles

Line of vacuum kettles and mixing tanks described and pictured in several technical bulletins.—*Lee Metal Prod., Philipsburg, Pa.* (255N).

Salad Filler

Data on fillers, for delicatessen type products, handling up to 35 containers per min.—*Triangle Package Mach. Co., 6637 W. Diversey Ave., Chicago.* (255O).

Tomato Line Units

Information on tomato equipment for processing raw material to finished product.—*Chisholm-Ryder Co., Inc., Niagara Falls, N. Y.* (255P).

Dough Mixer

Performance data on dough mixer featuring blender, cooling coils, and pipeline filter.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago.* (255Q).

Liquid Fillers

New bulletin describes features, construction, and attachments of line of liquid and semi-liquid fillers.—*Food Machinery Corp., Canning Machinery Div., Hoopeston, Ill.* (255R).

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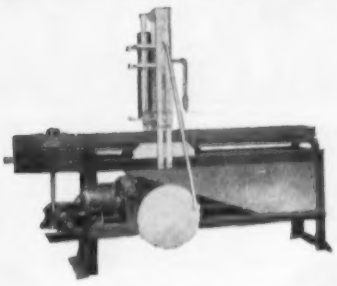

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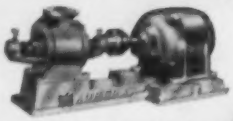

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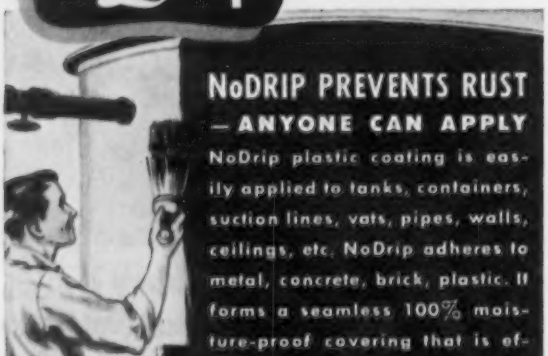

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Wide selection of tailormade packaging papers.—Riegel Paper Corp., P. O. Box 170, Grand Central Station, New York City. (256A).

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Samples and facts on the use of A-C polyethylene in bread wrapper waxes.—Semet-Solvay, Petrochemical Div., Allied Chem. & Dye Corp., 40 Rector St., New York City. (256B).

Wrapping Machines

General catalog of wrapping and packaging machinery with photos, capacities, and specifications. 15 p. —Battle Creek Packaging Machines, Inc., Battle Creek, Mich. (256C).

Plastic Wrap

Merchandising tips on products wrapped in plastic packaging. Three-color manual, 10 p. Standard Packaging Corp., Flex-Vac Div., 629 Grove St., Jersey City, N. J. (256D).

Multi-Can Packager

Multi-unit packaging of cans up to 900 per minute detailed. Machine handles variety of can sizes in ten different arrangements. 8 p. —Cluster-Pak Div., Atlanta Paper Co., Atlanta. (256E).

Elastic Liners

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Steel Drums

Stainless steel drums and pails feature wide range of capacities, liners, and fittings.—U. S. Steel Products, 30 Rockefeller Plaza, New York City. (256G).

Candy Wrapping Machines

Complete line of chocolate and candy wrapping machines described, with specifications.—Supermatic Packaging Corp., 132 Pacific St., Newark, N. J. (256H).

Drums and Pails

Data on steel containers with tailormade inner linings.—Inland Steel Container Co., 6532 S. Menard Ave., Chicago. (256I).

Automatic Casers

Information on automatic casers for variety of products.—Standard Knapp Div., Emhart Mfg. Co., Portland, Conn. (256J).

Plastic Tape

Details on use of tape for closures, also added premiums.—Minnesota Mining & Mfg. Co., St. Paul, Minn. (256K).

Inert Gas Packaging

Both vacuum and inert gas packaging accomplished with one machine. Details and specifications available in colorful brochure for Model 6-9.—Standard Packaging Corp., 629 Grove St., Jersey City, N. J. (256L).

Marking Attachment

Details given on automatic stamping device which attaches to case-packer or conveyor line.—Adolph Gottscho, Inc., Hillside, N. J. (256M).

INSTRUMENTS

Recording Charts

Samples of dial and roll-type charts included with explanation of recording charts for standard and special instruments.—*Technical Charts, Inc., 189 Van Rensselaer St., Buffalo 10.* (256N).

Metal Thermometers

Listing of types, sizes, ranges and stem lengths of line of metal thermometers for factory use.—*Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.* (256O).

Platform Scales

Description of scales with swivel dial that can be turned 350 deg. Bulletin 2001.—*Toledo Scale Co., Toledo 1.* (256P).

Canning Controls

Timed program and recording controllers included in description of line of equipment. Catalog 500.—*Taylor Instrument Co., Rochester, N. Y.* (256Q).

Temperature Control

Temperature of steam heated vats and tanks, controlled with adjustable temperature regulator. Bulletin 329.—*Powers Regulator Co., Skokie, Ill.* (256R).

Level Indicator

Illustrated description of liquid level indicator, water gages, remote signal alarms and other equipment. —*Yarway-Waring Co., 101 Mermaid Ave., Philadelphia 18.* (256S).

Missing-Cap Detector

Missing bottle caps, jar lids, and can ends detected as containers pass under electronic detector. —*W. F. & John Barnes Co., 301 S. Water St., Rockford, Ill.* (256T).

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AIR

THE INVISIBLE ABUNDANT RESOURCE WAITING EVERYWHERE FOR YOU TO USE

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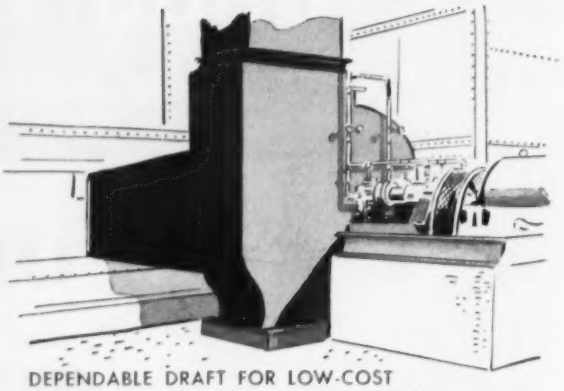
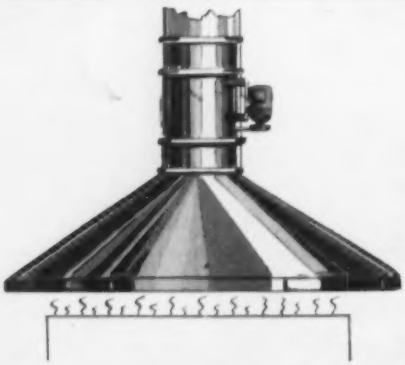


DEPENDABLE DRAFT FOR LOW-COST STEAM FOR POWER, HEAT, PROCESSING



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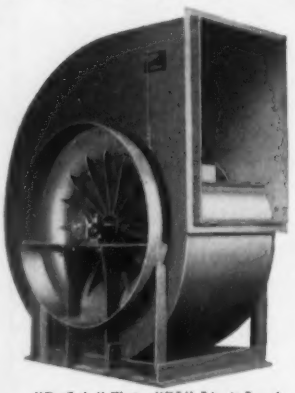
PROTECTING THE PRODUCT IN MANUFACTURING OR STORAGE

PUT YOUR AIR TO BEST USE with "BUFFALO" FANS

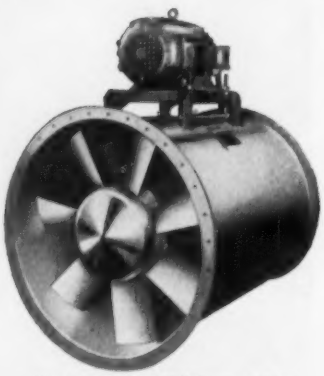
No other natural resource is so limitless in supply, yet so readily at hand as air — and none has more uses in industry, when properly handled.

Manufacturing efficient air handling equipment has been our business here at "Buffalo" for 78 years. During this time, "Buffalo" Engineers have successfully handled practically every air problem. This know-how and the resultant fine quality fans give you a bonus called the "Q" Factor — *the built-in Quality which provides trouble-free satisfaction and long life — every time you specify "Buffalo".*

Are you making fullest use of your air? Write today for proven ways of putting this resource to work.



"Buffalo" Type "BL" Limit-Load Ventilating Fan



"Buffalo" Type "B" Vaneaxial Fan

"Buffalo"

BUFFALO FORGE COMPANY

152 MORTIMER STREET BUFFALO, N.Y.

Publishers of "FAN ENGINEERING" Handbook

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Sales Representatives in all Principal Cities

VENTILATING PRESSURE BLOWING AIR CLEANING COOLING AIR TEMPERING HEATING INDUCED DRAFT FORCED DRAFT EXHAUSTING

Industrial Controls

Description of floatless liquid level and industrial controls with application diagrams and price list. —B/W Controller Corp., 2200 East Maple Rd., Birmingham, Mich. (259A).

Consistency Recorder

Continual measuring and recording of material with mixture consistency recorder. Data 367.—Minneapolis Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44. (259B).

INGREDIENTS

Ethyl Acetate

Physical and chemical data on properties of ethyl acetate. Booklet F-8140, 12 p.—Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York City. (259C).

Essential Oils

New Catalog and price listing for essential oils and certified colors. 36 p.—Dodge & Olcott, Inc., 180 Varick St., New York City. (259D).

Bread Making

Procedure, equipment, and formula explained for stable ferment bread-making process (FE Mar., p. 196). Bulletin 103D. —American Dry Milk Institute, Inc., 221 N. LaSalle St., Chicago. (259E).

Flavor Sheets

Handy folder of reference sheets for selection of proper flavors.—Fritzsche Brothers, Inc., 76 9th Ave., New York City. (259F).

MSG Flavor Boosting

Details on the use of monosodium glutamate in food products.—A. E. Staley Mfg. Co., Decatur, Ill. (259G).

Irish-Moss Stabilizer

Facts on colloid derivative of Irish moss for stabilization of products containing milk solids.—Seaplant Chemical Corp., New Bedford, Mass. (259H).

Facts on MSG

Monosodium glutamate facts and prices. Details of its use as a flavor intensifier in processing. —Great Western Sugar Co., Denver. (259I).

Enrichment of Flour

Reprints of articles on the enrichment of flour with vitamins and minerals.—Hoffman-LaRoche, Inc., Vitamin Div., Nutley, N. J. (259J).

Spice Seasonings

Data on new micro-ground spices which give full flavor without specks and promote more uniform mixing.—Wm. J. Stange Co., Chicago. (259K).

Corn Sugar

How crystallized corn syrup lends its properties as a moisture conditioner and emulsifying agent, also helps color retention and texture. Applicable to wide variety of foods and dry mixes.—Hubinger Co., Keokuk, Iowa. (259L).

MANAGEMENT

Personnel Management

Announcement and details of a conference series for executives. Eight-week course stresses prevention of problems through understanding of personnel.—Dunlap & Associates, Inc., 429 Atlantic St., Stamford, Conn. (259M).

Item Counter

Electric counter handles up to 1,000 tickets, tags, checks, or other items, per minute. Can be equipped to rubber-stamp items.—Pitney-Bowes, Inc., 1025 Walnut St., Stamford, Conn. (259N).

Sound Films

Catalog available covering educational and entertaining colored films. Steel manufacturing and construction, subjects applicable to food industry.—New York Film Distribution Center, U. S. Steel Corp., 71 Broadway, New York City. (259O).

Maintenance Management

Work scheduling, equipment records, and storage control made easy with card system. Illustrated, 7 p.—Remington Rand, Inc., 315 Fourth Ave., New York City. (259P).

QUALITY CONTROL

Room Incubator

Facts on walk-in constant-temp rooms, from 4 to 8 ft. deep, temperature range 40 to 140 deg. F. Bulletin 704A.—Labline, Inc., 217-221 N. Desplaines St., Chicago. (259Q).

Lab Equipment

Three new bulletins picture and detail Electrodeposition analysis, electrometric titration, and a sensitive constant-temp bath. Bulletins FS-250, FS-247, and FS-211. —Fisher Scientific Co., 717 Forbes St., Pittsburgh. (259R).

Enzyme Report

Information on enzyme regeneration in high-temperature short-time sterilization of canned foods. 10p.—Research & Development Dept., Continental Can Co., 4645 W. Grand Ave., Chicago. (259S).

Consult Evans Research Trained Sensory Panel

Whose proven methods can help you...

1. Find substitutes for scarce or expensive raw materials.
2. Reduce losses caused by fluctuating quality of raw materials.
3. Detect flavor adulterations.
4. Test effect of aging, packaging and transportation.
5. Screen rejects and returns.
6. Evaluate your product against competition.
7. Test the effects of formula and processing modifications.

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250 East 43rd St. New York 17, N. Y.

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For A Time-Tested Product, Use Natural Spices

American Spice Trade Association
82 WALL STREET, NEW YORK 5, N. Y.

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Get literature, catalogs or detailed information that you need from manufacturers of equipment, materials, supplies, ingredients.

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USE READER SERVICE

For more information, use coupon on last page.

You a target?

Let's face it . . . we're all targets!

If your plant is not ready with a disaster plan, better act now. There's not a single American plant that's out of range of an intercontinental bomber—and fires, floods, tornadoes or explosions can kill you just as dead as an atom bomb.

It costs next to nothing to take a few simple steps which may save hundreds of lives. Here they are. Check them off today.

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here, again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . lives are at stake . . . have you a right to delay?

"you can't afford to be without this P. D.* Sanitary Pump in your food plant"

Waukesha alone offers you all these

"...it pumps any food product in solution without damage"	The slow-speed, positive-displacement, rotary action pumps food products gently . . . provides smooth product flow without damage to cell structure—a real asset to any food processing plant . . . a real dollar saver.
"...it does not contaminate food or destroy food flavors"	Fabricated from Waukesha metal or stainless steel, as required, it is completely corrosion-resistant. There is no chance of food contamination . . . no chance for impairment of delicate food flavors . . . you protect your brand.
"...it's completely sanitary"	Its simple design and exclusive O-Ring Seal makes it quick and easy to disassemble, clean, sterilize and reassemble. The smooth polished surfaces . . . crevice-free construction—prevent all possibility of bacteria formation.
"...it's dependable and trouble-free . . . it does not leak"	Its minimum of moving parts, balanced twin-blade impellers, no metal-to-metal contact, heavy-duty ball bearing shaft support, the positive sanitary O-Ring Seal which excludes air and keeps the product in to prevent leakage—all make for a dependable, trouble-free pump.

Now you can pump smoothly and positively light, free-flowing liquids, heavy viscous products; meat and vegetable soups; whole cherries in syrup; jams and jellies; baby foods; pie fillings; beverages; cheese; chocolate, without damage to the product . . . without aeration or turbulence. Try this pump in your plant at your first opportunity. It will prove itself.

• Write for the name of your nearest Waukesha Pump Distributor. Also, consult or write the Waukesha Foundry Company, Dept. 4A, Waukesha, Wis., for complete pump information and recommendations.

Waukesha Foundry Company

* Positive Displacement

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Biochemical Consultants to Food and Pharmaceutical Industries

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Consult these SPECIALISTS

Let them save your time by bringing their broad experience in their specialty to bear on your problems.

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Specialists in Food Preparation, Preservation, Process Development, Production and Quality Control; Equipment and Package Testing and Evaluation; Cold Storage; Quick Freezing; Canning; By-Product Utilization; Natural Flavor Essences; Plant Sanitation and Pest Control; Home Economics; Surveys; Ethical Legal Work.

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Telephone: CApital 7-6865

FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*

Ingredient evaluations • New products development. Specializing in flour, shortenings, milk and other basic ingredients • Facilities: chemical and physical laboratory, bakery, spray dryer and other unit process equipment.

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Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony

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LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water.

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Chemical and Bacteriological Analysis; Plant Sanitation; Filth Analysis; New Product Development; Expert Testimony; Ultra-Violet, Visual, Infra-Red Spectrophotometry; Radioactive Tracers, Analysis for Trace Metals; Air Pollution, Odor and Flavor Controls.

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SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.

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Surveys, developments, research.
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Chemists—Bacteriologists—Food Technologists
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Project Research, Consultation, and Production Control Services in
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Write for Price Schedule

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For the Food Processor

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

SEARCHLIGHT SECTION

PLANT MANAGER

Fresh vegetable prepackaging firm located in the East. Excellent opportunity for resourceful executive to establish security with progressive organization. Must be adept in all phases of production, management, and maintenance. Salary commensurate with ability and experience. Preference given individual experienced in vegetable canning and freezing.

P-5948, Food Engineering
330 W. 42 St., New York 36, N. Y.

MAINTENANCE ENGINEER

Progressive fresh vegetable firm has exceptional opportunity for resourceful, qualified Maintenance Engineer. Eastern location. Salary commensurate with ability and experience. Preference given individual experienced in vegetable canning and freezing.

P-5950, Food Engineering
330 W. 42 St., New York 36, N. Y.

PROBLEMS CHEMIST

Must have chemistry or chemical engineering degree and four years minimum industrial experience, preferably in foods. Age: under 35, ability to advance. Position consists of administrative and technical project work.

PILLSBURY MILLS, INC.
1010 Eaton Road — Hamilton, Ohio

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave., (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1111 Wilshire Blvd. (17)

POSITION VACANT

FOOD TECHNOLOGIST of Food Chemist for product development and formulation in Bakers Specialties. Must have practical experience and a thorough background in the baking industry. P-6070, Food Engineering.

POSITIONS WANTED

MAN WITH 15 years practical and technical experience in food processing and packaging —cherries, olives, mayonnaise and pickles desires a position in similar field. Metropolitan area. PW-5970, Food Engineering.

(Continued on opposite page)

WE NEED
FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES —junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
7 W. Madison St. — Chicago 2, Ill.

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B.S. to Ph.D. Beginners—Experienced
We place EXCLUSIVELY with Chemical Companies
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AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

Send NEW ADVERTISEMENTS to New York City Office, 330 W. 42nd St., New York 36, N. Y., for the May issue closing April 21st

SALES AGENTS WANTED

Established manufacturer of high quality stainless steel filters extensively used in food, and beverage plants has profitable franchises open for qualified agents in the United States, Canada, Mexico, Central and South America. Understanding of food process engineering required; filtration desireable. Write in confidence stating qualifications, experience, present lines handled and territory covered.

RW-5622, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

MANUFACTURERS' REPRESENTATIVE

Territories available for revolutionary mixers with basic U. S. patent. Recent German design with proven performance for multi-purpose operation. **Laboratory models** and production models ranging through 6,000 gallons total capacity. Mixes powders, granulates, solids, fibers and liquids normally difficult to accomplish. Write full details of services and territory to

RW-6041, Food Engineering
330 W. 42 St., New York 36, N. Y.

POSITIONS WANTED
(Continued from opposite page)

FOOD TECHNOLOGIST—Chemist, age 33, experienced in milk, fish, edible oils and meat product control, development and research, wants position in research or development. PW-5871, Food Engineering.

FROZEN FOODS — Production, development and quality control supervisor with extensive manufacturing experience and practical know-how of industrial operations desires opportune change in position. Presently employed in precooked specialty field. Prefer suitable connection in fish, meat, or poultry industry. PW-5713, Food Engineering.

BUSINESS OPPORTUNITY

Wanted: A well rated food company to manufacture 6 market tested dressings, Roquefort, French, Garlic, Caesar, Celery and the sixth of a confidential nature, on a consulting royalty basis by food chemist of 20 years wide scale experience. BO-5987, Food Engineering.

CONTRACT WORK WANTED

We are packers of Shell, Frozen and Liquid Eggs of all types in the middle of an agricultural community, producing meat, wheat, corn, milk, and oats, etc. Have you a product we can manufacture for you with low cost labor and U.S.D.A. Approved Facilities? Nebraska Egg & Poultry Co., Inc., David City, Nebraska.

ASSISTANT GENERAL MANAGER

Food Technical college graduate, 35. 10 years successful experience food industry, coordinating research and quality with production, selecting and training of personnel, customer relations. Legal background underlines ability to get results with government control agencies and maintaining liaison on legislative activity.

PW-6006, Food Engineering
330 W. 42 St., New York 36, N. Y.

EQUIPMENT WANTED

Export buyer wants good, late-model processing equipment of any type, in New York City now for inspection, has cash to pay. Send detailed description, location, prices, with photographs in first letter.

W-6000, Food Engineering
330 W. 42 St., New York 36, N. Y.

WE HAVE IN STOCK
FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS	MIXERS
CANNING	MOTORS
CONFECTIONERY	PULVERIZERS
DAIRY	PUMPS
FILLERS	REFRIGERATION
MATERIAL HANDLING	SCALES
STAINLESS STEEL JACKETED KETTLES	STAINLESS-STEEL TANKS
MEAT PACKING	LARGE & SMALL STEEL TANKS

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Including steaming plant
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Copra drying.
Complete plant age 3 years.
Condition comparable to new.
Cost new $300,000
Price.....$125,000 F.A.S. Steamship—Carribean Location.

Complete set of photos available.

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TR. 5-5212

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Elsewhere in this publication, you will find an advertisement of the Geo. J. Meyer Mfg. Co. We have available, four of their "Cataract" automatic pasteurizers or coolers, used a few years only, available for immediate delivery, priced as low as 25¢ on the dollar.

1—only, Meyer Model 930 machine, capacity 100-12-oz. bpm
1—only, Meyer Model 1035 machine, capacity 132-12-oz. bpm
1—only, Meyer Model 1245 machine, capacity 210-12-oz. bpm
1—only, Meyer Model 1345 machine, capacity 225-12-oz. bpm

Complete details upon request. Offer subject to prior sale.

FS-5994, Food Engineering
330 W. 42 St., New York 36, N. Y.

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New, never used, duplex compressor consisting of 2—10½ by 10½ units, with 1—Ideal 200 HP, synchronous motor, never uncrated; also in plant recently closed, 2—Frick 10 x 10, with "Electric Machine Co." 185 HP motors; 2—Frick 6 x 6 with Ideal 30 HP motors; York 8 x 8, Vilter 7½ x 7½, etc.—all at ridiculously low prices, all first class condition, recently inspected.

FS-5996, Food Engineering
330 W. 42 St., New York 36, N. Y.

FILTER

Used Niagara, diatomaceous earth filter, with stainless riveted leaves, 250 sq. ft. area with separate closed slurry feeder; immediate delivery, bargain price.

FS-5997, Food Engineering
330 W. 42 St., New York 36, N. Y.

SAVE HERE

3—#12 Sweetland Filters, 48 cc. bronze Monel covered lvs, 3" cc.
1—50 gal. Stainless 347, Calandria Still, Agitated, Sight Glasses, with Condenser.
1—50 gal. Stainless 347, Agitated Tank, Motor Driven.
1—Sharples #C27 Super Dehydrator, S.S.
14—Sperry 18"x18" iron recessed Filter Presses, 18 chambers.
1—Fitzpatrick Model D S.S. Comminuter, Motor Driven.
3—450 gal. S.S. Steam Jcktd. Kettles.
1—Buflovak 48"x40" Drum Flaker, chrome plated, S/S ends.
1—Oliver Rotary Filter, 6'x6', Acid Construction.
4—Mojonnier, S.S. Vac. Pans, 3',5',6'.
3—6'x50' Louisville Rotary Tube Dryers.
1—Day size 30 Imperial jacketed 75 gal., Sigma Blades.
1—2TH, Mikro Pulverizer.
4—Buflovac Atmo. Dbl. Drum Dryers 24"x36", 32"x90", 42"x120".
3—Anco 4'x9' Chilling Rolls.
5—Horiz. Ribbon Dry Mixers, 4000 lb., 1500 lb., 500 lb.

Only a Partial Listing

WANTED
YOUR SURPLUS
MACHINERY OR PLANTS
☐ **SEND LIST TODAY**

Our 38th Year

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FOR SALE

PFAUDLER GLASS LINED TANKS

3,000 gal. cap. Complete fittings. Insulated. 4" outlet valve. Located Chicago.

BRIGGS & TURIVAS
141 W. JACKSON BLVD., CHICAGO 4, ILL.

6 NASH HYTO AIR COMPRESSORS

Need oil-free air? We have 6 Nash compressors, ranging in capacity 225 cfm. to 60 psi., with brand new Westinghouse 60 HP motor, 2—Nash Hytor units with 7½ HP motors; all first class condition, details upon request.

FS-5999, Food Engineering
330 W. 42 St., New York 36, N. Y.

IN STOCK AT LOEB'S

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51.
Collectors, dust: bag 5" dia. x 2½' to 5' long, steel.
Condensers: stainless steel and copper.
Conveyor Tables: belts from 5½" wide x 12' long, and up.
Cutters, silent: Buffalo 32" and 43".
Dicer: Sterling model EMIC-1/N2.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Extractor: Troy 26" monel basket.
Feeders: Syntron F-22, 10 x 36" trough.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure — Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired, 18" well.
Heater tubular: Creamery Package 65 sq. ft., stain. steel.
Kettles: Stainless steel 5 to 150 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto. and semi-auto.
Mills, attrition: 30" 40 hp.
Colloid: Charlotte 3 hp., Premier 3 hp.
Hammer: Mikro 1SH, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX. Fitzpatrick Homoloid model J.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity
Portable electric: ¼ to 5 hp.
Pan, vacuum: stain. steel 30 x 48".
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Peeler: Blakeslee model SN-27146.
Press: Davenport continuous #3A.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84".
Roball 40 x 120" stainless steel.
Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, vacuum: 500 gal. stain. steel.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. **Chicago 22, Ill.**
Telephone: Seeley 8-1431 **Our 31st Year**

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TOP QUALITY EQUIPMENT AT LOW REBUILT PRICES

30 Years of Reliability
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Modern Late Models for

- Canning
- Cooking
- Labelling
- Grinding
- Mixing
- Filling
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70E	74A	85B	141A	251C	251W	252B	256D	256D	266C
71A	74B	85C	141B	251D	251X	252C	256E	256E	266D
71B	74C	85D	142A	251E	251Y	252D	256F	256F	266E
71C	74D	85E	145A	251F	251Z	252E	256G	256G	266F
71D	74E	85F	148A	251G	251AA	252F	256H	256H	266G
71E	74F	131A	149A	251H	251AB	252G	256I	256I	266H
71F	74G	132A	150A	251I	251AC	252H	256J	256J	266I
72A	75A	132B	150B	251J	251AD	252I	256K	256K	266J
72B	75B	133A	153A	251K	251AE	252J	256L	256L	266K
72C	75C	133B	154A	251L	251AF	252K	256M	256M	266L
72D	75D	136A	156A	251M	251AG	252L	256N	256N	266M
72E	75E	136B	157A	251N	251AH	252M	256O	256O	266N
72F	75F	136C	157B	251O	251AI	252N	256P	256P	266O
73A	84A	137A	162A	251P	251AJ	252O	256Q	256Q	266P
73B	84B	137B	164A	251Q	251AK	252P	256R	256R	266Q
73C	84C	137C	166A	251R	251AL	252Q	256S	256S	266R 266S

☐ 1 yr. $2 ☐ 2 yrs. $3 ☐ 3 yrs. $4 Domestic rates only, for others, see p. 5.

Product or Service..... No. Employees in Your Plant.....

8	9	10	11	12	13	14
☐	☐	☐	☐	☐	☐	☐

OLD ADDRESS

No. & Street.....

City..... State.....

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Position .....Product .....

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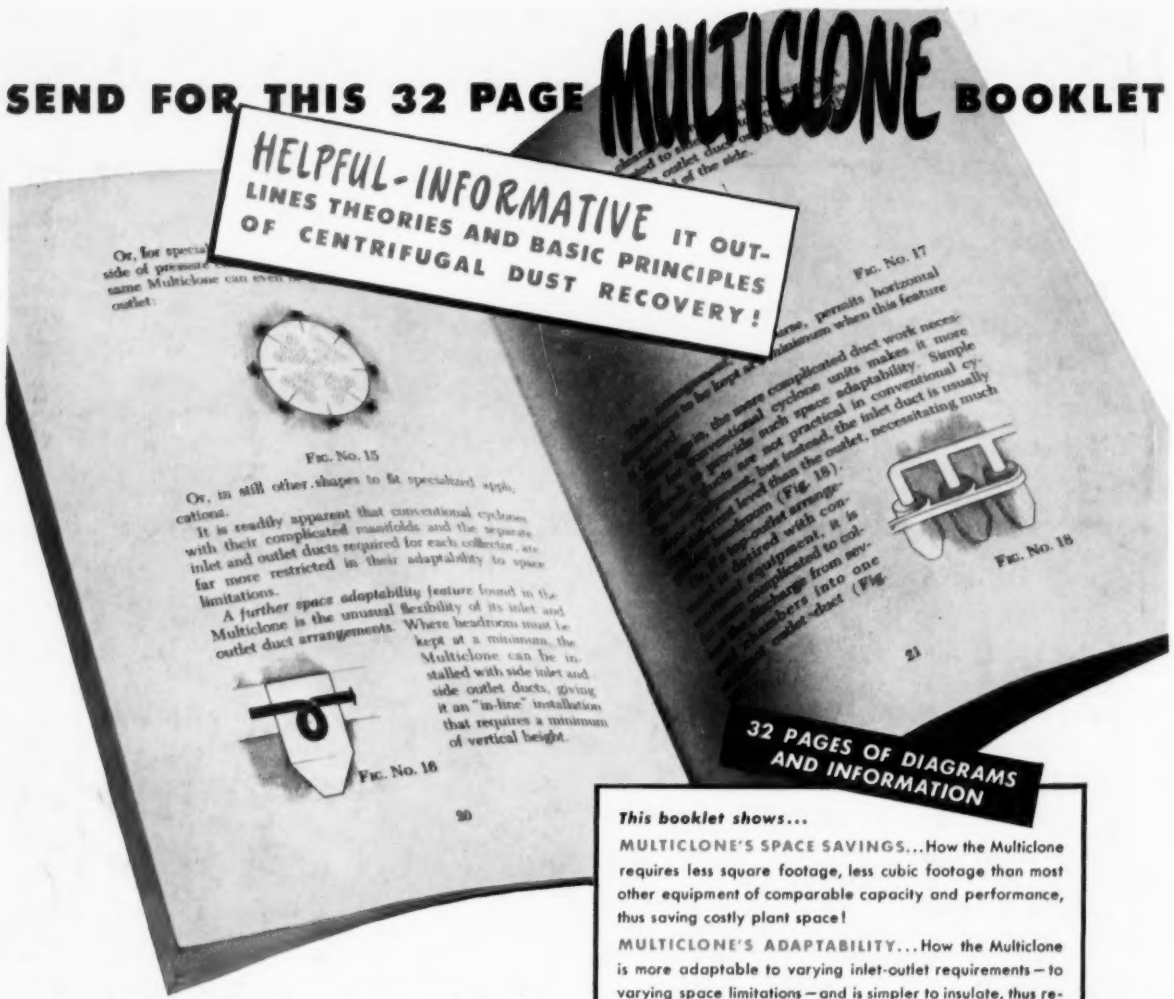
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FIG. No. 16
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